THE MONTHLY

Review

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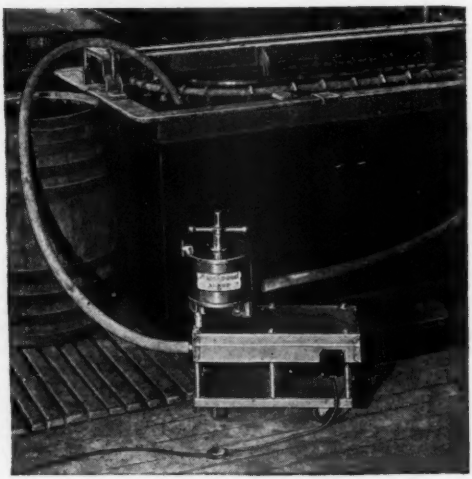
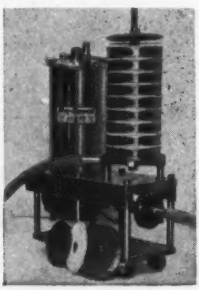
Alsop "SEALED DISC" FILTERS

For the plating rooms of the country



This is a familiar sight in the plating rooms in hundreds of plants.

A Filter that keeps your plating solutions clean of all trouble making dirt, sludge and impurities generally present in all solutions.



The secret of "Sealed Disc" filtration lies in the filter assembly above.

It pays to keep your solutions absolutely clean, so that they may give you in return maximum results in finer finishes, fewer rejects, increased production and economical production costs.

To know the value of "Sealed Disc" Filtration for all liquids including "Disc Pak" filters for oil

Send for our book on Filtration.

ALSOP ENGINEERING CORP.

32 GRAND STREET MILLDALE, CONN.

★ 1944 Convention ★

By E T. CANDEE

TEN years ago Plater's Conventions, like a lot of other conventions, were looked upon as an excuse to get away from home and have a vacation at the expense of the Company. There may have been some justification for this feeling in the old days when progress was comparatively slow in the industry, but under the present day conditions this attitude is not correct. While we would be the last ones to claim that conventions are completely without fun, we would also be the first ones to point out that today conventions are necessary and everyone benefits when he attends.

Today there are many new developments, each year some radically new, and the best way to get an unbiased account of them is at the Convention. The Convention gives an opportunity for the people who have developed them to tell about the new process. Also at a convention there will be a certain number of people who have had practical experience with the process and it is possible to talk with them to get the other side of the picture.

These should be sufficient reasons to attend, and we recommend that everyone make plans and reservations for June 12 to 14. This year's program will be up to the standards of other years.

LIXOL

Cowles'

EMULSION TYPE SOLVENT CLEANER

• Removes oil, grease, smut, grime, drawing and buffing compounds on all metals. LIXOL produces no chemical attack on sensitive metals. Protects metal against rust and tarnish, leaves surfaces ready for painting. Small parts are dipped in LIXOL at room temperature and rinsed with either cold pressure rinse or hot still rinse. LIXOL can be sprayed or brushed on large parts, rinsed with pressure spray. Adaptable to simple equipment. No fumes or objectionable odor and harmless to hands. Immediate delivery. Send for suggestions as to application of LIXOL to your particular problem.

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METAL CLEANER DEPT.

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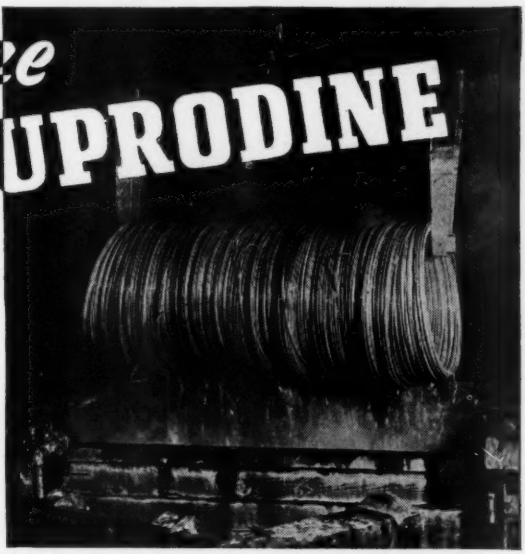
Cuprodize with CUPRODINE



for:

- **MORE DRAFTS** *Increased Production*
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- **LESS METAL PICKUP**
- **LESS SCRATCHING AND BREAKAGE**

Cuprodine is more than a lubricant—it is a chemical which reacts with the steel dissolving such minute quantities as are necessary to form a thin, adherent copper coating.

Cuprodizing wire to facilitate drawing is widely practiced in the mills. Cuprodizing strips, blanks, cups and shell cases of steel has improved drawing and speeded production.

With proper processing Cuprodized surfaces may be used for decorative purposes.

Cuprodized surfaces may be made more rust resistant if treated with Cuprotek.

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Company_____ ☐ *Cuprotek*

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- BICHROMATE OF SODA
- CHROMIC ACID

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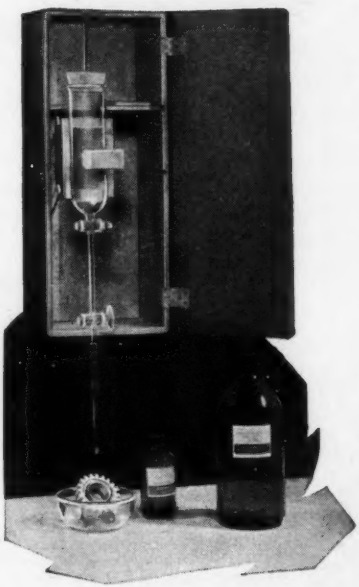
ZINC THICKNESS

Test It Yourself



This set, using the Hull and Strausser method aids in determining the thickness of Zinc, Cadmium, Tin and Copper deposits.

We also make sets to aid in control of plating, anodizing, cleaning and pickling solutions.

SIMPLE TO OPERATE

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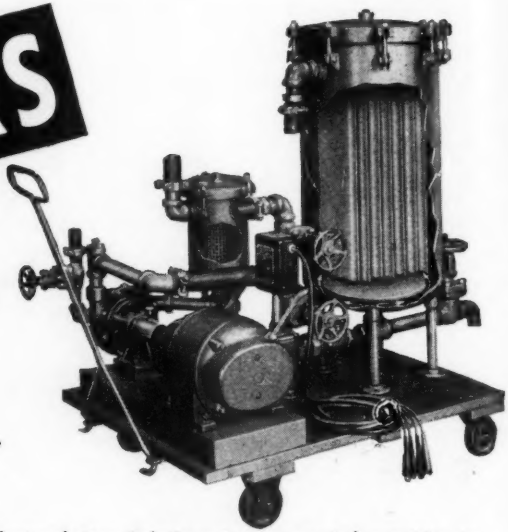
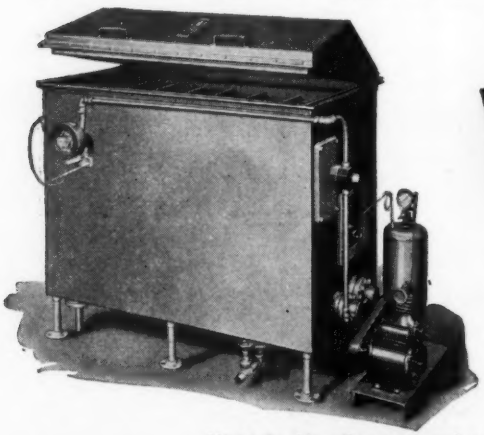
ELECTROPLATING SOLUTIONS

Degreasing Solvents
Industrial Oils
Coolants, Cleaners, Etc.



Filtration and Purification of Electroplating Solutions is an essential requisite to produce ***Quality*** plating.
Industrial Filters are built with ***larger*** filter areas, ***more*** sludge holding capacity, and are provided with highly efficient pumps. Based on actual experience in hundreds of leading plants, our filters provide platers with the most practical and efficient means of keeping their solutions Pure and Clean.



SALT SPRAY CORROSION TEST EQUIPMENT

The modern way to test electroplating or coated metals is with Industrial corrosion test equipment. With this equipment you can pre-determine the quality of work being done, and avoid costly rejects and loss of time. Made in sizes to suit your needs with temperature controlled up to 130 Deg. Fah. Meets Army, Navy Aeronautical Specifications as outlined in Bulletin AN-QQ-S-91-5 dated Dec. 1938, and Others.

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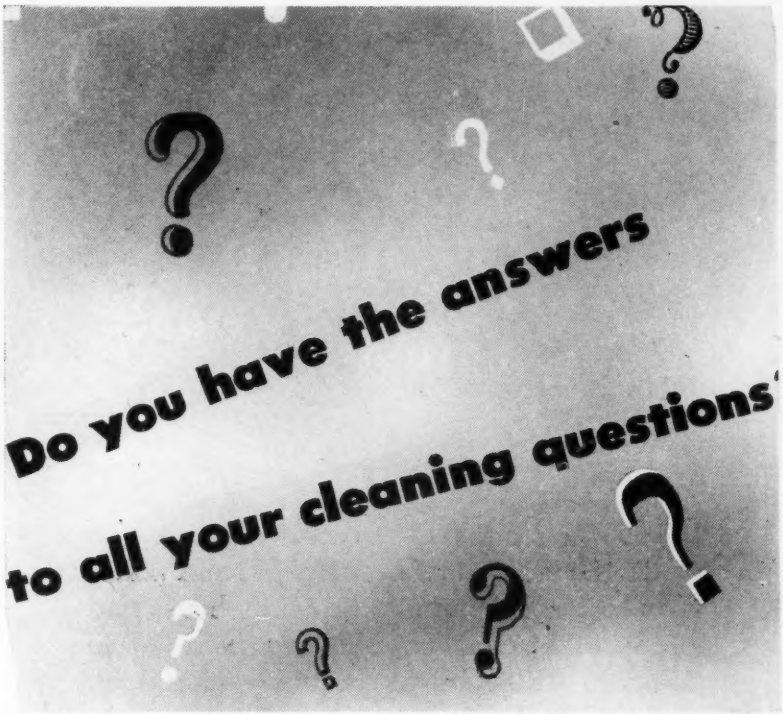

HIT-OR-MISS answers won't do—success comes with the *right* answers! That's where Wyandotte can help you—with a *full* line of metal cleaning and degreasing compounds.

In the rush of war production, of aircraft and munitions manufacture . . . for cleaning motor parts, projectile bodies, metal prior to plating and painting . . . for cleaning prior to anodizing, removing anodic film prior to spot welding, stripping airplane finishes . . . Wyandotte works swift wizardry.

Remember — there's a Wyandotte *specialized* cleaner for every metal cleaning problem and for use in every type of equipment. If you wish help on any problem, call in the Wyandotte Representative. He's always on tap.

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Grinding, Polishing, Or Sharpening
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CUSHIONED BELT GRINDER

Here's a real all-purpose grinding and polishing machine that will grind and polish iron, brass, aluminum, bakelite, horn, and many other materials. It can be used to sharpen drills, knives, or any edged tool.

An abrasive faced belt runs over a rubber surfaced ball bearing pulley and the work is polished on this pulley. There are no wheels to buy, to set up, or turn down. The belts are low in cost and easily changed in a few seconds.

Don't waste time with files and sandpaper — and don't hold up expensive production machines — get a Lasalco Cushioned Belt Grinder. It's supplied with a stand or for bench mounting.

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ELECTROPLATERS

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OUR line of Special Finishes for Electroplaters meets all customary requirements. For detailed information on any of these finishes, merely check the list below, attach to your letterhead and mail.

If, however, you have an individual problem, write for the helpful Wartime Consultation Service of our staff of finishing engineers. They will gladly give you the benefit of a vast amount of research into materials and methods to relieve today's problems of shortages and curtailments. There is, of course, no obligation.

CLEAR LACQUER for steel . . silver . . gold . . brass . . copper . . nickel and other metals . . .	**NON-STAIN SPOT LACQUERS** especially developed for protecting coatings of copper . . brass . . silver . . .	**WATER-DIP No. 33** for iron, aluminum, cadmium - plated and other production plated parts . . eliminates fingerprints and staining during assembly.
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TOP-COAT LACQUER high gloss . . mat . . .	**LACQUER-ENAMELS** in all colors and for every purpose . . .	**DULAC RACK ENAMELS** for protecting plating racks . . .
DULAC STOP-OFF LACQUERS for sectional plating . . .	**CLEAR PRIMERS**	**PLATELUSTRE** a semi-transparent coating that simulates many plated finishes and gives a colored metallic effect.

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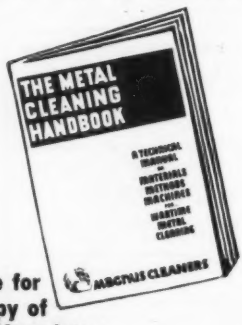
MAGNUS ALL-PURPOSE MACHINE FOR METAL CLEANING

Made in wide range of sizes to handle parts of every size and shape from bulk treated small units to individual pieces. Smaller sizes are portable.



Write for a Copy of This Complete Manual

HERE'S A NEW MACHINE ADAPTED TO ALL METHODS AND MATERIALS FOR METAL CLEANING

Whether your metal cleaning is best carried on through the use of alkaline solutions, emulsifiable solvents (Magnus Emulso-Clean), chlorinated solvents or any other type of cleaner, this machine will fit well in your production flow sheet. It can not only be used on any of these cleaning methods, but it can, in many cases be set up to use more than one method, where the process demands it.

This machine is unique in its method of providing agitation. Instead of the ordinary methods, the work itself is continuously moved up and down in a "dunking" motion which greatly increases both the speed and effectiveness of any cleaning material.

The Magnus All-Purpose Machine will speed up your cleaning operations. Let us work with you in selecting the right cleaning method and material to use. Magnus makes machines ***and*** cleaning materials, and can make unbiased recommendations.

MAGNUS CHEMICAL COMPANY
41 SOUTH AVENUE GARWOOD, N. J.
Representatives in Principal Cities

Magnus CLEANERS-METHODS-MACHINES

Half a Job Won't Do!

. . . *Do the Whole Job and Do It Right*

You can't stop halfway in the electroplating job and wind up with a satisfied customer. The metal you're going to plate must be thoroughly cleaned, of course. But that's only *part* of the job. Unless the *solution* is kept clean—the impurities *continuously* removed—the plated metal may be dull, have poor ductility, poor adherence.

Give DARCO S-51 the purification job! It's an activated carbon and it removes impurities by *adsorption*. Soap, oil, grease, colloid molecules, decomposition products and "invisible" impurities are grabbed up by DARCO's great *adsorptive* surface—and filtered out when you filter through the DARCO.

DARCO S-51 is effective in solutions for many types of plating, such as bright nickel, cadmium, cyanide zinc, iron, copper, gold, silver. It acts physically—does not change the chemical composition of your product.

A little DARCO goes a long way, costs little. Order from your dealer—or write for a sample. Get in touch with us about your plating problems.

Darco—Reg. U. S. Pat. Off. .

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This trademark identifies the genuine. Accept no packages without it.

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FINISH PROBLEM? Let Egyptian take it off your mind

During three wars and long periods of peace, Egyptian Finishes always have been something special, something finer, from the *protection* and *appearance* standpoint, and from the standpoint of application.

Today...if war production, post war production—or both—pose any kind of a finish problem...put it up to Egyptian.

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Special correspondence on finishing problems is invited.

THE EGYPTIAN LACQUER MANUFACTURING COMPANY

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Any size wheel or bob can be cut from walrus hide—in any thickness from ½" to 1¼".

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FOR FAST production of quality zinc plate, plan *now* to introduce Du Pont Zinc Plating procedures in your plant. The proper plating solution can be installed easily and used in standard plating equipment. Any experienced platèr can get either matte or bright zinc plate, as desired, on a wide variety of work.

"DUROBRITE"—for production of bright deposits from solutions made up with standard chemicals.

"ZIN-o-LYTE"—Bright zinc deposits directly from baths made up with prepared salts.

DUCTILE ZINC—Matte white deposits, suitable for deep drawing and sharp bending.

STRAIGHT CYANIDE ZINC—Easily controlled plating solutions for production of fine-grained deposits.

* * *

Consult us today! Du Pont technical men will supply complete details—show you how easily and economically a Du Pont Zinc Plating process, together with proper chemicals, can be adapted to your specific requirements. They'll help you, too, with the installation and operation of a Du Pont process in your plant. Write, phone or wire: E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington, Del.

Let's ALL BACK THE ATTACK!

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DU PONT CHEMICALS • PROCESSES • SERVICE
***for* ELECTROPLATING**

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

IN PLANNING FOR CONVERSION

Think Beyond "FIRST COSTS"

THINK *ALSO* OF:

LOW MAINTENANCE
FLOOR SPACE
SIMPLE INSTALLATION
LONG LIFE
HIGH EFFICIENCY

- No moving parts (except fans)—no periodical overhaul, negligible maintenance,
- Space economy. Selectro-Platers require less space than any other power supply,
- No installation expense. Cost nothing to install. You roll them into place.
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RECTIFIER EST. G 1892 **ENGINEERS**

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BECAUSE THEY'RE
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"American Made" Felt Polishing Wheels are made of high grade pure wool. No loading or weighting of any character is used. The material is uniform in texture throughout the wheel. Hardness is acquired by shrinkage of wool only — the greater the shrinkage the harder the wheel. Made in any diameter, also in face widths from ½" to 6". For wider face widths, submit specifications. "American" felt wheels are made in nine degrees of hardness.

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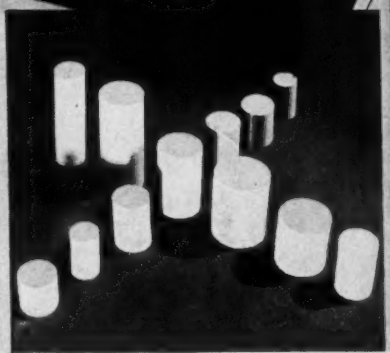
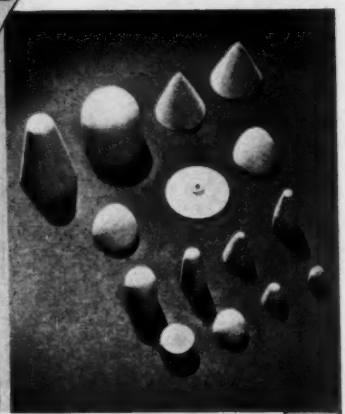
"America's Best Buy — BONDS!"
American Buff Company

AMERICAN MADE

FOR *Better* JOBS

Felt BOBS





"American Made" Felt Bobs properly set up, are used extensively for all types of burring and polishing operations. Easily formed and retaining their shape, they are ideal for irregular surfaces. The perfect medium for internal polishing and for those hard to get at surfaces.

Write, wire or telephone for further information concerning Polishing and Burring BOBS of other Materials, such as Cloth, Sheepskin, Walrus and Bullneck Leather Bobs.

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"BONDS Back Our Boys!"

American Buff Company

If your post-war plans are under consideration, Detrex men will gladly offer suggestions and recommendations for incorporating your degreasing equipment into the new production plan.

When the manufacture of civilian goods is resumed, Detrex Degreasers now in operation in most plants can be adapted immediately to new production.

Where possible, Detrex Degreasers have been designed with the dual purpose of cleaning both war and peace products. In other cases, slight changes in construction will permit their efficient use.

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BUY MORE WAR BONDS

Now DU-LITE BLACK FOR ZINC!

FOR BLACKENING ZINC STAMPINGS DIE CASTINGS and ZINC PLATED PARTS

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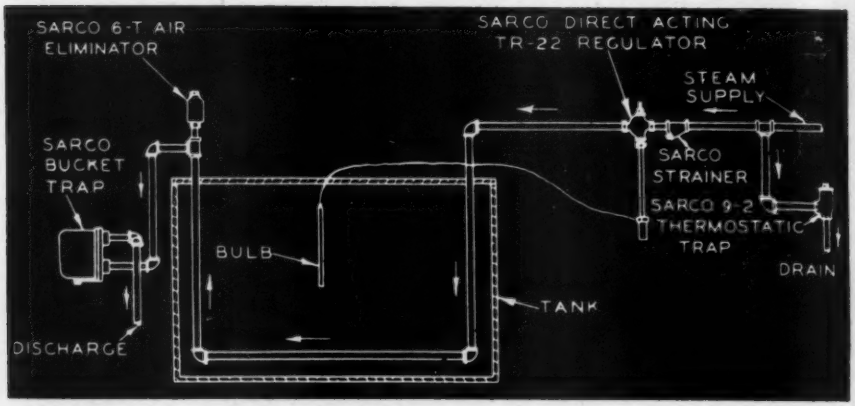
To carry the Du-Lite name, a new product must meet established requirements of the Du-Lite Sales and Engineering Departments, proven by laboratory tests. The product must also pass numerous field tests under actual production conditions. Du-Lite ZN has passed these tests.

Du-Lite ZN is an attractive, deep black that will meet many requirements for a final finish. Also an excellent base for organic finishes. The process is simple and foolproof and the chemicals are non-hazardous.

Write for details and send samples of your products for trial finishing.

DU-LITE CHEMICAL CORP.
MIDDLETOWN, CONNECTICUT

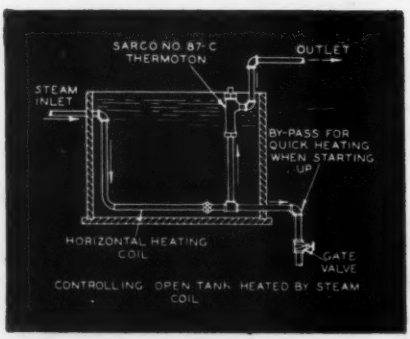


How exact should plating control be?

Above we show a job which called for extreme exactness and reliability of tank temperatures. It is held within a degree — is protected against air binding, foreign material in the lines, and against needless waste of heat.

Below is an example of the most inexpensive tank control, which acts as both a steam trap and a regulator and holds within a few degrees.

If you need both heating and cooling for chromium or other processes, Sarco Electric Controls will do the trick.



The nearest Sarco representative can select the lowest cost combination to give the results you want on every process in your shop. Ask for the catalogs on plating control.

26

SARCO COMPANY, INC.
475 FIFTH AVENUE
NEW YORK 17, N. Y.

SARCO CANADA LTD., 85 Richmond St., W, TORONTO, ONT.

EBONOL "C"

Patent Pending

FOR BLACKENING AND PROTECTING COPPER AND COPPER ALLOYS

The steel panel shown at the right was copper plated 0.0002" thick. Half was Ebonol "C" treated and the whole panel was oiled. The unblackened section rusted at 16 hours and was badly rusted after 200 hours in salt spray. The Ebonol "C" treated half was almost perfect after 200 hours.

Ebonol "C" is a simple chemical process for blackening copper and copper alloys to get adherent, corrosion resisting coatings of cupric oxide. Dull or matte coatings can be obtained.

Send samples for blackening so you can see this modern finish for war or post war use.

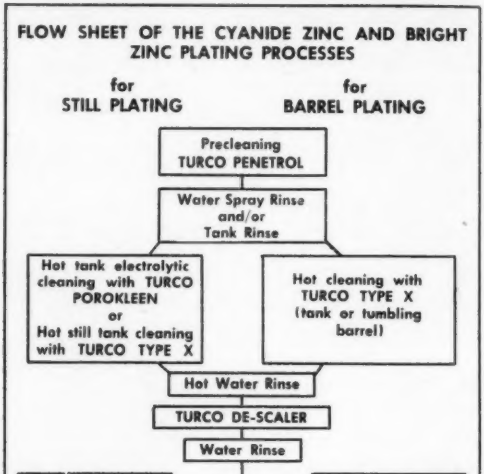
OTHER BLACKENING PROCESSES AVAILABLE FOR STEEL — ZINC — ALUMINUM

THE ENTHONE CO.

NEW HAVEN, CONN.

ZINC PLATING

TYPE X
POROKLEEN
PENETROL


FLOW SHEET OF THE CYANIDE ZINC AND BRIGHT ZINC PLATING PROCESSES
for STILL PLATING
for BARREL PLATING
Precleaning TURCO PENETROL
Water Spray Rinse and/or Tank Rinse
Hot tank electrolytic cleaning with TURCO POROKLEEN or Hot still tank cleaning with TURCO TYPE X
Hot cleaning with TURCO TYPE X (tank or tumbling barrel)
Hot Water Rinse
TURCO DE-SCALER
Water Rinse
Cyanide Zinc or Bright Zinc Plate (Still Solution)
Cyanide Dip
Cyanide Zinc or Bright Zinc Plate (barrel)
Cold Water Rinse
Chromic Acid Dip
Hot Water Rinse
Dry
or
High Carbon Steels 375° F. Bake—3 Hours

Working in co-operation with industry, Turco research chemists and field engineers have solved the plating problems of hundreds of war production plants. The data thus compiled has been summarized in a comprehensive bulletin.

"CYANIDE ZINC AND BRIGHT ZINC PLATING"

Turco offers this bulletin as a free service to industry. It describes materials, equipment and the practicable technique required in most plating operations where it is necessary to replace cadmium plating with zinc plating.

A consultation with your nearest Turco Field Service Man, who will prescribe the material and equipment you need, merely awaits your request.

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SPECIALIZED INDUSTRIAL CHEMICAL COMPOUNDS

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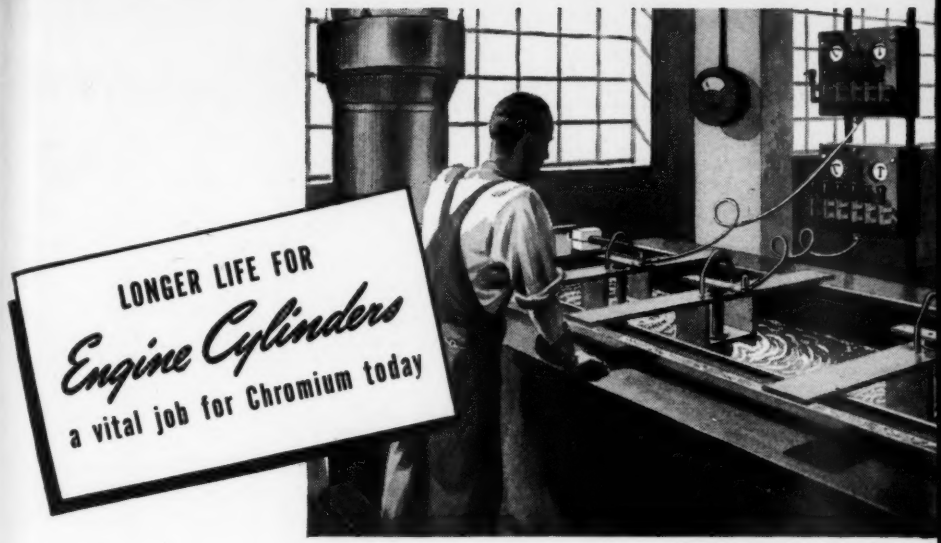
SERVICE MEN AND WAREHOUSE STOCKS IN ALL PRINCIPAL CITIES



...handled in accordance with the processes developed by United Chromium through years of research and experience covering all phases of electro-deposited chromium

Oil-retaining deposits of chromium plate which offer improved lubricating properties and increased service life are being produced for specific uses by numerous licensees of United Chromium. The proper application of this plated surface to cylinder walls of Diesel and Aircraft engines, to piston rings and other wearing surfaces calls for an *engineering* approach to each specific problem. Service requirements, base materials, cleaning cycles, coordination and control of operations are just a few of the factors that must be considered if plating is to be most effectively used.

These are the tried and proved methods that United Chromium offers you ... the experience of U. C. men in the field and in our plants and research laboratories . . . the results of "living" with Chromium Plating since its inception and building it into the vital production and salvage tool it is today. Write us for information on specific applications explaining briefly the nature of your problem.

UNITED CHROMIUM TECHNICAL ADVICE ASSISTS LICENSEES TO: —

1. Obtain installations properly designed to meet specific requirements
2. Put installations into prompt and efficient production
3. Meet strictest specifications
4. Conserve metals and materials
5. Utilize manpower more efficiently
6. Eliminate plating bottlenecks
7. Reduce waste due to rejects
8. Lower over-all plating costs

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☆**UNICHROME ALKALINE COPPER** for smooth, lustrous copper plating in a non-cyanide bath.

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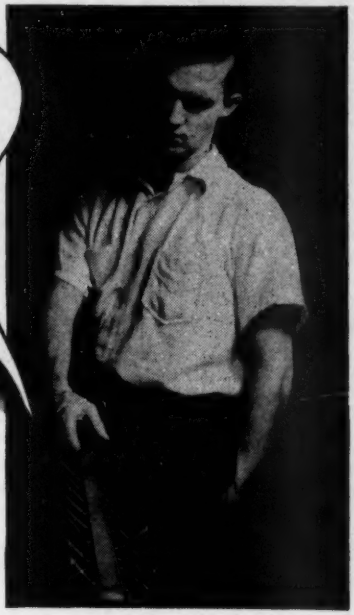
What is the *Right* PROTECTIVE COATING *for this* RACK?



It is extremely important that the correct protective coating material be selected for use on a specific type of rack. One type of material—regardless of its excellence for certain purposes — will not meet every requirement.

A very intricate rack, for instance, requires a material of high solids and low viscosity. A simple single spline rack could be dipped in a high viscosity material which would build up the film much faster even though each coat would require longer drying time. Different types of plating baths necessitate the use of different coating materials.

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This Manual is Yours for the Asking

A book which can be your guide in the selection and proper use of protective coating materials used not only for the insulation of plating racks but for numerous other purposes. A copy will be sent you without obligation if request is made on your company letterhead.

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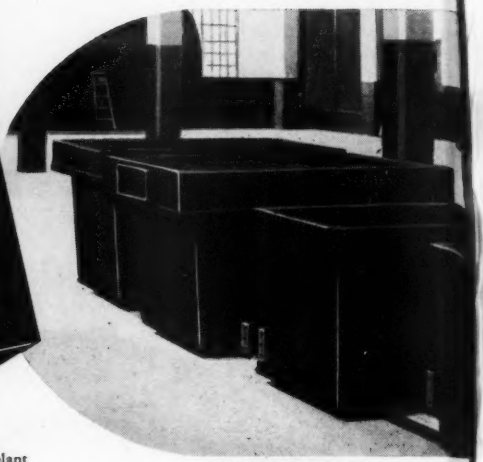
HERE'S HOW TO USE TYGON For Better Plating



IT'S tough enough these days to run a plating plant without being faced with breakdown of equipment from corrosive attack, or too frequent recoating of hooks and racks from faulty insulation, or excessive loss of time and materials from ineffective masking solutions.

A lot of plating operators have learned they can use the various Tygon formulations to excellent advantage in minimizing these annoyances. For Tygon, the chemically inert plastic material, fits in perfectly with many plating operations. If you haven't tried Tygon — you're missing a good bet.

TYGON Tank Linings

Tygon tank linings will handle any plating solution without contamination. Possess high dielectric strength. Dense, free from pin-holes. Sturdy and tough Tygon tank linings will stand even abnormal abuse. Bond with almost integral adhesion to steel.

TYGON Tempro-tec

Tops as a masking material, or for temporary protection of surfaces between polishing room and plating bath, Tygon Tempro-tec may be applied by brush, spray or by dipping. It air dries quickly, peels easily free, usually in a single piece. One gallon covers about 250 square feet of surface. Resists any plating solution, including hard or bright chromium. Clear or in colors.

TYGON
Hook and Rack Coatings

Tygon Tape, .012 thick, ¾" wide, when wrapped spirally around hooks and racks and either solvent or heat sealed forms a continuous, chemically inert, insulating coat. Because Tygon does not "wet" easily, it lessens loss of solution through "drag-out". Liquid or gel Tygon formulations are also available.

Tygon Tape, Tempro-tec and Tygon Paint are usually available through your local plating supply dealer. If not, write direct to The U. S. Stoneware Co., Akron, O.

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ALKALINE ZINC PLATING SODIUM ZINCATE SOLUTIONS

By N. A. TOPE

Read before Birmingham Section of the Electrodepositors Technical Society

JUST over twelve months ago it became necessary for us to change from Cadmium to Zinc plating; and in order to effect this change with the minimum of alterations to our equipment and technique, it was necessary to install a solution with the following characteristics:

(1) A cathode efficiency of at least 75%.
(2) An electrode efficiency ratio of approximately 1:1.
(3) Suitable for use in unprotected steel tanks, at room temperature, and with a maximum vat potential of 6 volts.
(4) Deposit Zinc onto grit-blasted steel surfaces without the use of acid pretreatments.
(5) Have a throwing power comparable with that of a Cyanide Cadmium Solution.
(6) Operate without the use of Mercury and/or organic addition agents.
(7) Start plating without the use of strikes and other special techniques.
(8) Give a deposit with a satin-white color and which will protect steel components against a continuous 20% salt spray for at least 150 hours.

Points 1, 2, 3 and 5 are quite obvious and require no further comment.

The 4th characteristic, namely that the alkaline solution should deposit Zinc onto an unmodified grit-blasted surface was necessary, in our case, because of the risk of jointed components entrapping acid and subsequently failing in service through corrosion fatigue. For this reason, acid treatments either before or after plating are undesirable. All Cadmium plated components were prepared for plating by grit-blasting.

Concerning Point 6, the use of Mercury is, of course, forbidden in DTD 903, whilst from a technical point of view organic addition agents which cannot be controlled by simple analytical checks are not welcome.

We consider 'strikes' to be inefficient from all aspects, and in any case would be impossible with our barrel plating equipment where the full 6 volts P. D. is required for normal plating. These are the reasons for Clause Seven.

A satin-white deposit was highly desirable as a lustrous deposit is more difficult to discern on polished or ground steel surfaces. The 150 hour continuous 20% salt spray test was considered the minimum that should be withstood by a plated component, and would approximate the conditions which obtain during its average life.

Having ascertained our requirements, all the recent publications upon the subject were examined, and the following conclusions arrived at:

(a) By comparison with tin or copper plating, the information was very scarce.

(b) British sources of information were rather indefinite and frequently conflicting. Each author seemed to claim a different Cyanide or Caustic Soda content as being optimum. Obviously this could not be the case.

(c) American sources were more definite, but without exception all suitable solutions employed Mercury and/or organic addition agents.

Some 214 cathode/anode efficiency determinations were therefore carried out in the laboratory, with solutions covering a wide range of Cyanide, Caustic Soda and metal contents, and the following is a summary of the observations made:

(a) In no case was Zinc deposited onto a freshly grit-blasted steel surface at current densities up to 15 A.S.F.

(b) With most solutions the deposit could be started by 'striking' at a current density of 40/50 A.S.F. If, however, the work is 'struck' for five minutes at a current density of 50 A.S.F., during which time no metal is deposited, and then plated for 25 minutes at 10 A.S.F., the maximum cathode efficiency cannot exceed 53%. In actual practice 35% was found to be the maximum cathode efficiency obtainable.

(c) All the solutions were exceptionally sensitive to the surface condition of the base metal, giving an effect of poor covering power.

(d) Higher cathode efficiencies and better covering power were obtained when pickled or electrolytically etched cathodes were employed.

From a consideration of the above observations it was surmised that owing to the ready dissociation of the Zinc Cyanide complex,

Sodium rather than Zinc was deposited under our conditions. The Zincate salts appeared to be the only alternative materials suitable for preparing an alkaline zinc solution, but here too a paucity of information upon the properties of the compound was evident.

SODIUM ZINCATE SOLUTION No. 1

It was found that due to hydrolysis and other causes a molar solution of Sodium Zincate could not be prepared, and at the time a solution containing 8 ozs. of Zinc to 48 ozs. of Caustic Soda per gallon of solution was the best that could be prepared.

At a current density of 10 A.S.F. the cathode efficiency was only 2%, but owing to the low resistivity it was possible to employ much higher current densities. At 20 A.S.F. the cathode efficiency rose to 32%, and at 40 A.S.F. it had further improved to 57%. The deposit was white but the covering and throwing power of the solution were both poor.

The excess of Caustic Soda could not be neutralized with Acid, since this lead to the precipitation of Zinc Hydroxide, which did not redissolve. The artifice of buffering was therefore resorted to and the addition of Rochelle Salt (Sodium Potassium Tartrate) produced the results recorded in Graph No. 2.

SODIUM ZINCATE SOLUTION No. 2

Meanwhile it was found that a solution containing a higher metal to Caustic Soda ratio could be prepared by dissolving Zinc oxide in a boiling, saturated solution of Caustic Soda, and in that way a solution containing 8 ozs. of Zinc to 24 ozs. of Caustic Soda per gallon was prepared.

This solution exhibited a cathode efficiency superior to No. 1 Solution, but the plating range was curtailed. The effect of Rochelle Salt additions are clearly shown by the results recorded in Graph No. 3, and as in the case of solution No. 1 the optimum Rochelle Salt concentration appears to be 10 ozs. per gallon.

One barrel and one still Cadmium Vat were changed to No. 2 Zinc solution with 10 ozs. per gallon of Rochelle Salt. The only alterations consisted in discarding the old electrical resistance boards and replacing them by a single knife switch and an ammeter of larger capacity.

The following observations were made:

Barrel Solution:

The resistance of the solution was approximately one-third that of the previous Cadmium solutions, so that three times the original current could be passed for the same Vat potential and the plating time was accordingly reduced.

The deposit was matt white and satisfactory for our purposes.

The throwing power was poor, but quite satisfactory for the processing of Nuts and Bolts which constitute the major proportion of our barrel plated components.

The solution was also very sensitive to a difference in "surface activity" and although trouble was not experienced when plating components machined all over, those which had only been partly machined would only plate on the machined surfaces, leaving the remainder an unsightly black color.

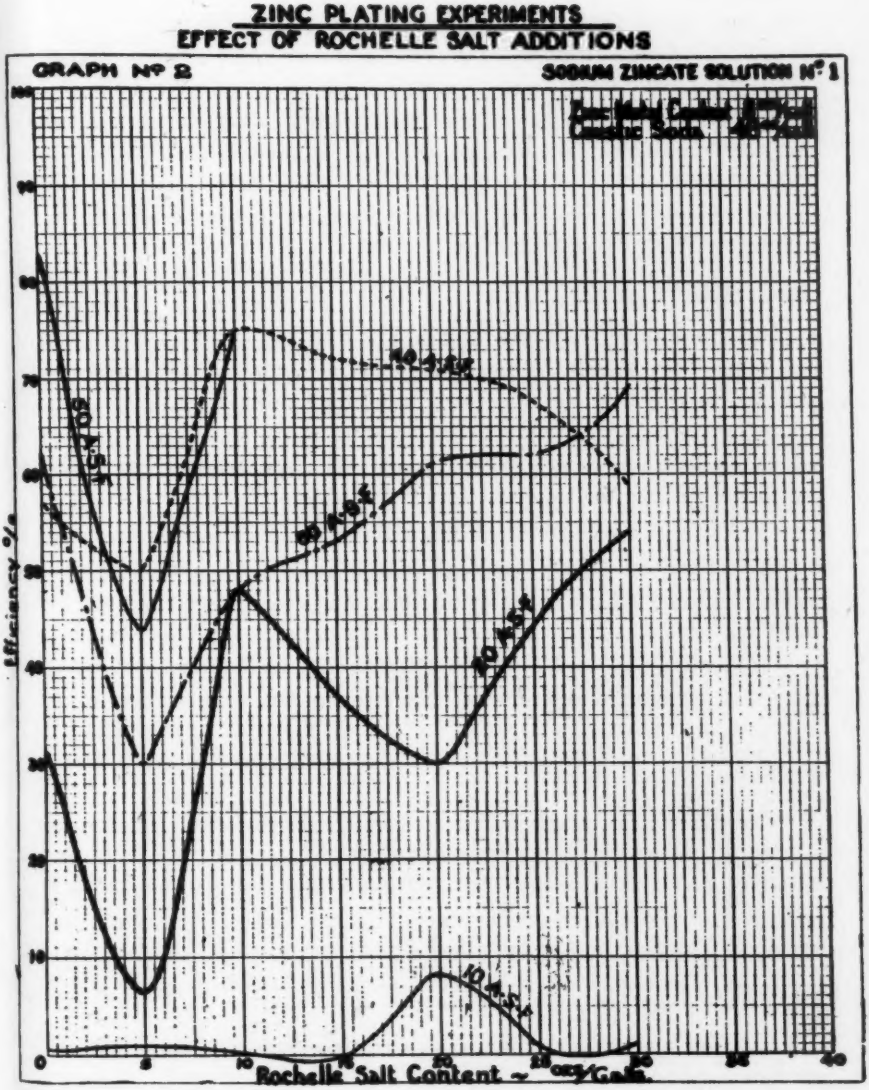
This could be rectified in two ways, either by re-grit-blasting, paying particular attention to the defective areas, or by pickling or etching. In either case the deposition potential was made uniform enabling the components to be plated satisfactorily.

STILL VAT SOLUTION

The Still Vat solution exhibited all the advantages shown by the barrel solution, giving a .0003″ deposit in 15 minutes at a current density of 35 A.S.F.

The sensitivity of the solution to surface 'activity' and the poor throwing power created many difficulties, but it was noticed that both the throwing power and covering power of the barrel solution improved after several days use. This could only be attributed to the absorption of Carbon Dioxide from the atmosphere which buffered the solution; so the still solution was treated with Dricold (Solid Carbon-dioxide) until the Sodium Carbonate content had risen to 12 ozs./gallon. Naturally additions of Caustic Soda had to be made accordingly in order to keep the total alkalinity at 25 ozs./gallon. This treatment resulted in a considerable improvement in the throwing power, providing Primary Distribution (throwing power O) in a Haring Cell set at a cathode distance of 1:3.

The next step was to enlist the aid of the Mass Action Phenomenon, and the solution was saturated with Sodium Sulphate. The throwing power again improved without a sacrifice of cathode efficiency. The


ZINC PLATING EXPERIMENTS
EFFECT OF ROCHELLE SALT ADDITIONS
GRAPH Nº 2
SODIUM ZINCATE SOLUTION Nº 1
Efficiency %
Rochelle Salt Content

improved throwing power was equivalent to +38% with a cathode distance ratio of 1:3, as compared with +65% to +82%, at a cathode distance ratio of 1:5, obtained with the previous Cadmium solutions. Although Laboratory results would indicate a big difference between the throwing properties of Zinc and Cadmium solutions, this has not been noted with the practical solutions. All components which were formerly Cadmium plated are now satisfactorily Zinc plated, and they include certain very heavily recessed and otherwise difficult components. Three barrel and one still plating solutions have been in continuous operation for above nine months, during which time a considerable amount of practical data has been collected.

Zinc Metal Content:

For all Laboratory work the metal content was maintained at 8 ozs. per gallon. Practical experience indicates that the metal content may fall to 5 ozs./gallon with the usual results, namely improved throwing power, a tendency towards 'burnt' deposits, and a decrease in cathode efficiency. At 6 ozs./gallon the cathode efficiency is about 50%. Below 5 ozs./gallon the solution is quite valueless.

It has not been possible to study the effect of increasing the metal content above 10 ozs./gallon, but it is probable that the usual laws will obtain, giving an extended plating range, and a decrease in the throwing power.

In general the metal content is not critical, but where solutions of type II are employed it is desirable to estimate the metal content every 50 working hours.

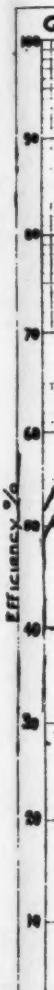
Rochelle Salt Content:

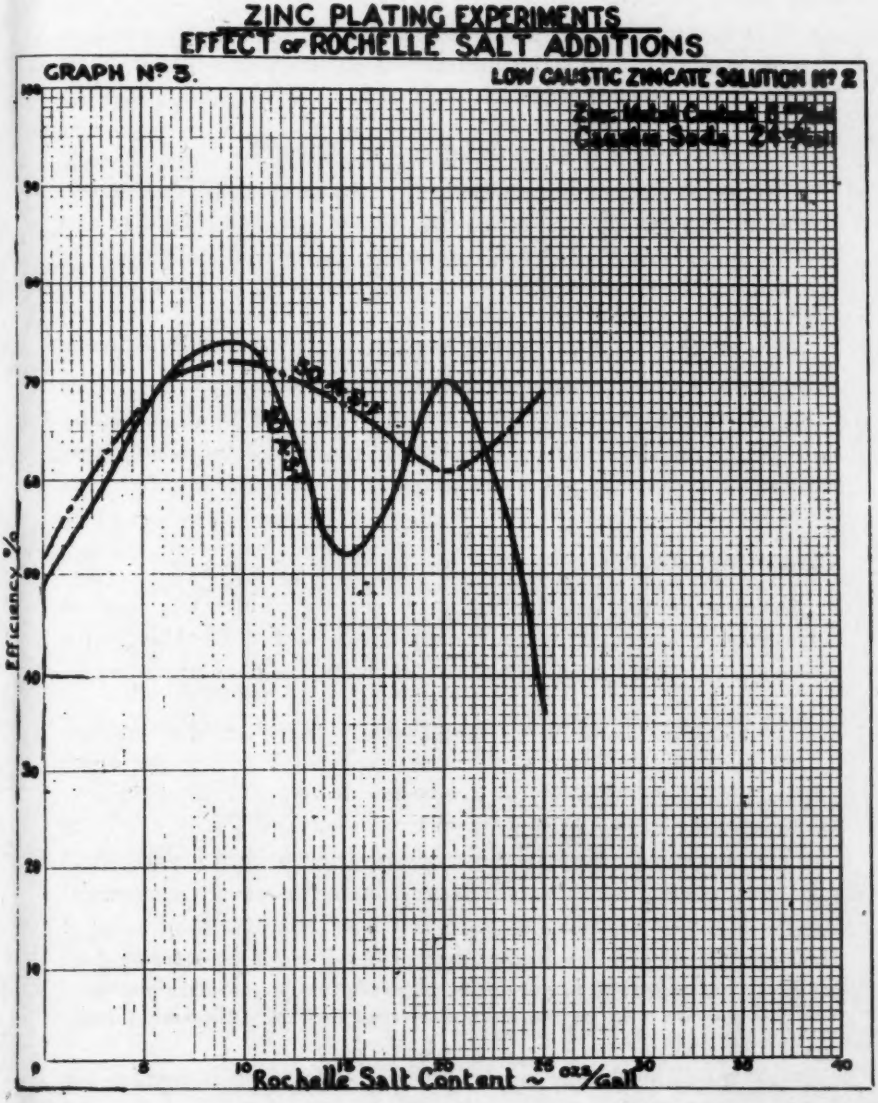
The Curves on Graph 3 indicate that the Rochelle Salt concentration is critical, and this has been confirmed in practice. It should not be allowed to fall below the safe minimum of 9 ozs./gal., as below 8 ozs./gallon there is a serious decrease in cathode efficiency and throwing power.

Titratable Caustic Soda Content:

All of the Sodium compounds which turn phenolphthalein red are estimated collectively by an empirical method, and are referred to as "the titratable Caustic Soda Content."

At 24 ozs./gal. of 'Caustic Soda' the solution is meta-stable, precipi-




ZINC PLATING EXPERIMENTS
EFFECT OF ROCHELLE SALT ADDITIONS
GRAPH Nº 3.
LOW CAUSTIC ZINCATE SOLUTION Nº 2
Efficiency %
Rochelle Salt Content ~ ozs/Gall
0
5
10
15
20
25
30
35
40
50
60
70
80
90
100

tating Zinc Hydroxide when diluted, heated, or even electrolyzed. At 28 ozs./gal. the solution is stable, but 32 to 34 ozs./gal. is preferable especially if the metal content has to be 'built up.'

The Caustic Soda Content decreases through the formation of carbonates and other causes, so that this simple check should be carried out once every 50 working hours.

Sodium Carbonate & Sodium Sulphate Contents:

These two compounds appear to be complementary. The Sodium Carbonate content should not be below 11 ozs./gal. and should preferably be maintained at 13 to 14 ozs./gal. There is little difficulty in maintaining this concentration if the solution is occasionally air-agitated.

The Sodium Sulphate Content is maintained at saturation point by keeping crystals of the salt at the bottom of the Vat.

Loss of either of these salts is clearly indicated by a substantial decrease in the throwing and covering properties of the solution, so that these constituents need not be estimated more frequently than once per month.

Care of the Anodes:

Laboratory tests indicated an anode efficiency which was constant between 80% and 90%, but in practice most of the difficulties experienced can be attributed, directly or indirectly, to poor anode corrosion.

Although the anodes were purchased as 'electrolytic zinc' they acquired an insoluble black slime after about six hours work, which reduced the anode efficiency to a very low figure. Chemical analysis has shown the film to consist of the hydroxides of Zinc, Nickel and Iron.

The practice of dipping the anodes into 50% Hydrochloric Acid every five working hours, or after every break, has proved of material assistance, whilst agitation of the solution is also beneficial since it breaks up the slime and washes it away. Agitation of the solution does not however, appear to improve the structure of the cathode deposit.

The use of a large number of anodes has the following advantages:

(a) It ensures the low anode current density which is essential for high anode efficiencies.

(b) It assists the throwing power by ensuring a more even pri-

mary distribution of the current.

(c) It is an aid to specification plating and the formation of deposits with uniform color and texture.

It is understood that one of the difficulties associated with bright Zinc plating is the maintenance of an electrolyte free from contaminants such as Iron, Nickel, Copper etc. The zincate solution may prove of advantage for this purpose, since of the common base metals, only Zinc Aluminum and Tin are soluble in Caustic Soda.

We also believe that the characteristics of Zincate Solution No. 1 are suitable for the electrogalvanizing of sheet, rod, wire, etc. especially if Potassium is substituted for Sodium so that advantage is taken of the greater ionic mobility of the former element.

Current Density:

A current density of 30 to 40 A.S.F. obtained by using a vat potential of 4½ volts, deposits between .0003″ and .0004″ of Zinc in twelve minutes in the Still Plating equipment.

The resistance of the barrelling solutions being one-third that of the former Cadmium solutions, only 20 to 25 minutes are required to deposit .0003″ instead of one hour.

Needless to say the increased current density has resulted in an increased and more consistent production, since there is now less incentive for the operator to 'wander' away whilst the work is in the vat.

The deposits obtained at these current densities are a matt-white color, but have a larger grain size than is desirable. Nevertheless the type of deposit is acceptable.

Addition Agents:

With a properly regulated solution the use of addition agents is unnecessary, but if the metal content is low, the addition of 1.25 to 1.75 ozs. per gallon of Molybdic Acid may prove advantageous as this will reduce the tendency to form 'burn deposits.' As this constituent can be analytically controlled it cannot be included in the embargo upon addition agents.

SOLUTION No. 3

The secret of success with Solution No. 2 lies in preventing the anodes from becoming excessively slimed.

In a well disciplined department this should present no difficulty, since this condition is indicated by a substantial increase in the vat resistance. However, should this condition obtain the consequences are more serious than is usual, because a metal deficit cannot be rectified by the direct addition of metal salts, and building up from anodes is slow. Therefore despite our long period of satisfactory work it was decided to look for some way of improving the anode corrosion.

There were two obvious methods (a) by increasing the Caustic Soda concentration and (b) by adding Cyanide salts. The former method has probably much to recommend it for bright plating solutions, but it can only be partially satisfactory where impure anodes are employed. The second method was therefore investigated.

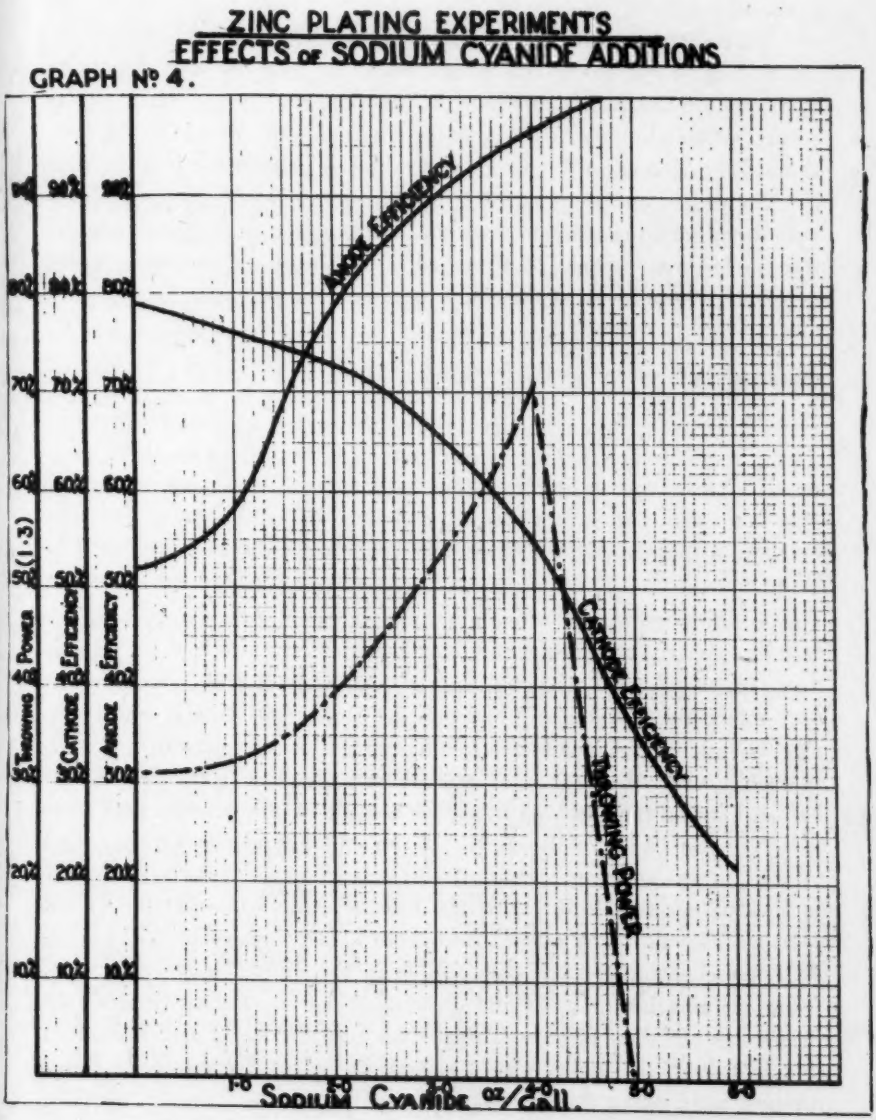
The Sodium Cyanide was introduced in quantities of 1 oz./gal. at a time, and the anode and cathode efficiencies, together with the throwing power number determined for each increment. The correlation of the results obtained with the Cyanide content is shown in Graph No. 4.

It would appear from the curves obtained that the concentration of Sodium Cyanide is very critical at 4 ozs./gal., but this does not strictly obtain under practical conditions. The addition of Sodium Cyanide depresses the deposition potential, so that by operating at a slightly higher current density the cathod efficiency is substantially restored. This is clearly shown in the case of a solution containing 8.5 ozs./gal. of Sodium Cyanide; the anode and cathode efficiencies at the various current densities are given in the following table:

Current Density	*Anode Efficiency*	*Cathode Efficiency*
20 A.S.F.	118%	Nil
30 A.S.F.	93%	Nil
40 A.S.F.	97%	Nil
50 A.S.F.	86%	33.4%
60 A.S.F.	67%	45.2%
70 A.S.F.	69%	66.0%
80 A.S.F.	60%	36.6%

Throwing power number (1 : 3) at 70 A.S.F. = +21%

The decreased anode polarization enables higher current densities to be obtained for the same vat potential, which, in most cases, compensates for the decrease in the deposition potential. It has been found


ZINC PLATING EXPERIMENTS
EFFECTS OF SODIUM CYANIDE ADDITIONS
GRAPH Nº 4.
Anode Efficiency
Cathode Efficiency
Throwing Power
% Throwing Power (1-3)
% Cathode Efficiency
% Anode Efficiency
Sodium Cyanide oz/Gall.

that 3½ to 4½ ozs. of Cyanide per gallon are sufficient to prevent 'sliming' of the anodes, and this concentration appears to be optimum from all points of view.

An unexpected advantage of the cyanide additions was a substantial refinement in the grain size of the deposit. For the first few hours after plating the Zinc can hardly be distinguished from Cadmium deposits; although after a few days the Zinc tends to assume the conventional Zinc-blue color.

Solutions containing Cyanide have been in use for over two months with exceptionally satisfactory results, and the necessity for acid dipping the anodes has entirely disappeared. The throwing power has been consistently good, whilst the deposits have complied with our requirements in every respect.

Preparation of Solutions:

Zinc Oxide was originally used as the source of metal when preparing the solutions, but as its solubility is only .0016 gms./litre, compared with 860 gms./litre for Zinc Sulphate, the latter salt is now exclusively employed. As, however, both sources readily form Zinc Hydroxide, with a solubility of only .004 gms./litre, extreme care must be taken when preparing the solution to ensure that the Zinc salts dissolve.

To prepare the solution, place in an iron tank equipped with a heating device, such as a plain iron hot swill etc., 40 ozs. of Caustic Soda for every gallon of plating solution. Dissolve the Soda in the very minimum of water and bring to the boil. Add slowly, whilst stirring, 37 ozs. of Zinc Sulphate crystals per gallon of solution in quantities not greater than ¼ lb. at a time, and dissolve as far as possible before making the next addition. When all of the soluble salts have dissolved add 10 ozs. of Rochelle Salt per gallon, and allow the solution to cool. Next treat the solution with solid Carbon-dioxide (Dricold) in small quantities, noting that the Caustic Soda concentration is not reduced below 28 ozs./gallon, until there is sufficient carbonate to produce a concentration of 14 ozs./gallon in the diluted plating solution. Allow the solution to stand and syphon off the supernatent liquor into the plating vat, then add 6 ozs. of Sodium Sulphate and 4 ozs. of Sodium Cyanide, dissolved in hot water, per gallon of plating solution. After diluting and mixing the solution is ready for use.

The preparation of the solution is a lengthy and unpleasant job, and we have found it more convenient to prepare our smaller barrel

solutions from the solution in the large still vat, later building up the metal in both solutions by electrolysis.

METHODS FOR ANALYZING THE SOLUTIONS

The analysis of the solutions is extremely rapid and simple as below:

Zinc Metal Content:

1. Transfer an aliquot volume, equivalent to 2 mls. of the plating bath to a 250 beaker or flask.
2. Add 50% Sulphuric Acid until phenolphthalein indicator turns white, add 10 mls. in excess. Evaporate to 3 mls., taking care not to evaporate to dryness.
3. Add 10 gms. of Ammonium Chloride, 3 spots of Diphenylbenzidine indicator, and dilute to 150 mls.
4. Cool to 16°C.-20°C. and titrate with $\frac{M}{20}$ Potassium Ferrocyanide reagent, until the violet color, which forms after the addition of 3 to 5 mls. of the standard reagent, disappears leaving a green solution.

$$\text{Vol. of } \frac{M}{20} K_4Fe(CN)_6 \times .392 = \text{ozs./gal. Zinc.}$$

$\frac{M}{20}$ Potassium Ferrocyanide solution contains 21.09 gms. of the salt plus .0050 gms. of Potassium Ferrocyanide made up to 1 litre with distilled water. It is standardized against Analar Zinc Sulphate when 1 ml. should be equivalent to .0049 gms. Zinc.

Rochelle Salt Content:

1. Transfer an aliquot volume, equivalent to 5 mls. of the plating solution, to a 250 ml. beaker.
2. Neutralize with 50% Sulphuric Acid to phenolphthalein indicator, and then add 15 mls. in excess. Evaporate to 3 mls., but do not evaporate to dryness.
3. Dilute to 150 mls. Add 1 gm. of Manganous Sulphate and heat to 90°C. Add $\frac{N}{10}$ Potassium Permanganate Reagent until a brown precipitate forms.

4. Reheat to 90°C. and continue adding $\frac{N}{10}$ Permanganate Reagent until a rich brown permanent precipitate forms.
5. Add a known volume (10 mls.) of $\frac{N}{10}$ Oxalic Acid to clear the precipitate.
6. Titrate back with $\frac{N}{10}$ Permanganate Reagent until the usual end point is obtained.

$$\left(\text{Vol.} \frac{N}{10} \text{ Potassium Permanganate} - \text{Vol.} \frac{N}{10} \text{ Oxalic Acid}\right) \times .15 =$$

oz./gal. Rochelle Salt.

NOTE: Tartrates are only quantitatively oxidized in a solution at a temperature of 85°C.-90°C., and in the presence of Manganese Salt.

Titratable Caustic Soda Content:

Titrate an aliquot sample, equal to 2 mls. of the original bath, with $\frac{N}{2}$ Hydrochloric Acid Reagent, using phenolphthalein as indicator. The end point is where the intense scarlet changes to a rose pink color.

$$\text{Vol.} \frac{N}{2} \text{ Hydrochloric Acid} \times 1.6 = \text{ozs./gal. Free Caustic Soda.}$$

Sodium Carbonate Content:

1. Transfer an aliquot sample, equal to 5 mls. of the original bath to a 250 ml. beaker.
2. Bring to the boil and maintain at boiling point for 20 minutes. Filter off Zinc Hydroxide and wash ppt. with hot water.
3. Heat filtrate at 90°C. and add 10% Barium Chloride Reagent from a pipette until the precipitate ceases to form. Add 2 mls. in excess.
4. Stand for one hour and then filter through a soft paper. Wash well with hot water.
5. Transfer paper and precipitate to the original beaker.
6. Add 50 mls. of boiling water and titrate with $\frac{N}{2}$ Hydrochloric Acid Reagent using methyl orange as indicator.

Vol. of $\frac{N}{2}$ Hydrochloric Acid $\times$ .212 = Ozs./gal. of Anhydrous Sodium Carbonate.

Estimation of Molybdic Acid:

1. If Molybdic Acid is known to be present take sample as for normal Zinc estimation.
2. Neutralize with 50% Sulphuric Acid to phenolphthalein indicator. Add 10 mls. in excess. Evaporate to 3 mls.
3. Dilute to 100 mls. heat to boil and 'gas' for ½ hour with Hydrogen Sulphide gas.
4. Filter through pad, wash with Hydrogen Sulphide wash.
5. Boil out Hydrogen Sulphide gas from filtrate and proceed as for estimation of Zinc from Stage 3.
6. Ignite Sulphide precipitate at a temperature of 600°C. Cool and weigh.

Weight of ppt. $\times$ 80.0 = ozs./gal. Molybdic Acid.

Estimation of Sodium Cyanide:

1. Transfer an aliquot sample, equal to 2 mls. of the original solution into a 350 ml. flask.
2. Add 3 mls. of 10% Potassium Iodide Reagent, and titrate quickly with $\frac{N}{10}$ Silver Nitrate Reagent to the yellow opalescence of Silver Iodide.

Vol. $\frac{N}{10}$ Silver Nitrate $\times$ .784 = ozs./gal. of Sodium Cyanide.

As the titration proceeds Zinc Hydroxide begins to precipitate, but if the titration is carried out rapidly the yellow opalescence of Silver Iodide can be recognized above the white turbidity.

The method is not exact but is sufficiently accurate for control purposes.

There are still a number of interesting avenues to be explored in this field, and the presentation of this paper at this stage is given in the hope that it may be of some assistance to those electroplaters who are experiencing difficulties in Zinc Plating onto grit-blasted surfaces.

In conclusion I would like to acknowledge my grateful thanks to

Mr. C. W. S. Dixon, B.Sc., who obtained the necessary permission from Messrs. Rootes Securities Ltd. to present this paper; to Mr. J. Kaisermann, who has kindly corrected and criticized the draft copy; to Mr. Powell, B.Sc. who carried out much of the tedious laboratory work, and last, but not least, to Mr. Reading who has persevered with the practical application of the solutions through their teething troubles.

Answers to Some Questions in Connection with the Paper Presented on May 4, 1943

Q. Can some details of the purity of the anodes used be given?

A. The anodes for the production vat were ordered from a reputable supply house as "Ball type Anodes, Electrolytic Zinc." Analysis indicated that they contained 0.93% Iron, 0.32% Lead, and a trace of Nickel. These figures are, I believe, typical for the material generally in use in this country for Zinc Anodes.

The Anodes used in the Laboratory tests were made by casting plates of A. R. grade Zinc. This is another source of discrepancy between Laboratory and commercial results.

To date it has been impossible to ascertain the effect of using the Zinc-Aluminum type anodes, which are so commonly employed in the U. S. A.

Q. How does the cost of the Zincate Solutions compare with those for the normal cyanide zinc and cadmium electrolytes?

A. On account of the high price of Rochelle Salt, the Zincate Solutions cost about two-thirds that of the normal Cadmium solutions. This is capital cost however, since the Rochelle Salt is not plated out, and is offset by the lower power costs and the absence of the heating service.

Q. Has the effect of temperature been explored?

A. No. Clause 3 of our lists of essential solution characteristics was very important since the installation of a heating service would entail a major alteration to the production equipment.

For interest sake one experimental run was made with solution No. 2, at a temperature of 100°F., when no Zinc was deposited at a current density of 40 a.s.f. It was probable that by further increasing the current density to counteract the decreased hydrogen overpotential the deposition of zinc at this temperature could be effected.

Q. Can the solution be prepared by electrolysis in a similar manner to which Sodium Stannate solutions are frequently prepared?

A. This avenue has been explored without appreciable success.

The difficulty lies in obtaining a cathode material upon which the zinc will not deposit; for example upon grit-blasted steel surface, working at a current density of 10 a.s.f., visable deposition starts after about 2 hours, and upon carbon rod after about a quarter of an hour. Naturally once the deposition of zinc begins it proceeds with rapidly increasing efficiency until there is no further gain in continuing electrolysis. In all probability the problem is not insolvable, but it is doubtful whether the method would show any advantage over the one already described, in view of the long time required to prepare the solution and the obnoxious fumes emitted when caustic soda solutions are electrolyzed.

Q. Can the solutions be used for direct plating onto cast-iron?

A. Yes, but our experience with this material is very limited. No cathode efficiency runs have been made using this material, but it augurs well that the solution will deposit onto carbon rod.

Q. How does the protective value of the deposit compare with deposits obtained from the normal electrolytes?

A. Components processed by both methods have been subjected to a continuous 20% salt spray test, when they exhibited corrosion, according to their shape, after 300 to 450 hours. It has been found impossible to detect any difference between the protective value of the deposit obtained from the two types of electrolyte.

Q. What is the effect of the solution upon the operator's skin?

A. It is essential to wear protective clothing when operating solution No. 1, but solutions Nos. 2 and 3 have been operated since their introduction with no complaint by young girls whose only protective clothing was rubber gloves, having voluntarily discarded the rubber aprons. It is interesting to note that the pH value of the last two solutions lies between 11.0 and 11.5 which is less than for some of the conventional cyanide zinc solutions, and furthermore the Zincate solutions are operated at room temperature.

Q. What is the relative importance of the various constituents?

A. This is a difficult question to answer since the importance will vary with conditions, but we should suggest the following order:

1. Rochelle Salt.
2. Sodium Sulphate. This constituent practically determines the throwing and covering power of the solution.
3. Sodium Carbonate.
4. Zinc Metal.

5. Free Caustic Soda.

6. Sodium Cyanide.

Q. Can a reason be suggested for the periodicity exhibited in graphs 2 and 3? The steepness of the curves is disconcerting.

A. Naturally we have theorized upon the reasons for the shape of the curves, but nothing concrete has been established.

A member then suggested that the peaks coincided with the formation of Zinc Tartrate Salt, with excess of one or other constituent producing the troughs.

A. That is one possible explanation.

Q. Has the effect of addition agents other than Molybdic Acid been studied?

A. With the exception of Teepol 'X' the effect of organic addition agents have not been studied. This exception was made because of the reported improvement to the structure of the cathode deposits when this material was added to the normal electrolyte. 0.3% of Teepol 'X' was added to each of the still and barrel vats. No change could be observed in the deposits obtained from the barrel vat, but with the still vat solution the deposit was whitened a little, and perhaps more important it reduced the tendency for course grained deposits to form at points of high current density.

This addition agent is quite unnecessary where work of regular contour is being plated but may prove of advantage when work containing sharp corners, points or edges is to be processed.

PLATER WANTED

A California manufacturer of diamond dental drills needs the services of a plater who has had experience in this type of plating.

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CLEVELAND EXHIBITS

By WALTER PINNER

BEFORE the war, the exhibits at our annual convention involved a display of our plated ware. Such a display became either unwise or impossible following Pearl Harbor. There was then instituted a photographic exhibit which, to an extent, replaced the other. It is felt, however, that a change is again in order, and this proposal has been approved by the executive officers of the Society, the Cleveland convention committee, and various members of the society who have been consulted.

The general scheme was suggested in an article appearing in the January issue of the *Review*. This article was intentionally presented to excite a spirit of fun as well as of interest for the reason that the proposed exhibit can embody elements of both. It is conceivable that a large number of members have, in their possession, some curious article with a story behind it. Others may have an unusual creation of their own which they would be willing to display. Still others may have pieces picked up in travel which many of the members would be unable to see except under such circumstances. There are no restrictions as to the amount or kind of articles to be exhibited. They can involve elements of interest, education, or just plain fun.

Certain manufacturers are to be contacted and asked to display unusual products, even though such articles may have no connection with our industry. Two such contacts have already been made by way of feeling out the situation, with gratifying results. It is definitely the intention of the National Exhibit Chairman, in cooperation with the Convention Committee, to not permit such exhibits to involve advertising. We want articles with an educational or human interest background.

With each branch cooperating, this exhibit should be worth while. Locked glass cases will be provided for the safekeeping of each article, if required. In the event a story lies back of the article, such story can be typed on a card to be attached to or lie near the piece.

As in all things new, this proposal requires the cooperation and action of every branch. It is therefore requested that this letter be read

to every branch by its secretary at the February meeting. It is further requested that each branch immediately appoint an Exhibits Chairman. This chairman should, at his earliest opportunity, canvass his branch and inform the National Chairman as to reactions and commitments promised. This is necessary in order that provision be made for equipment, cases, etc., at Cleveland.

The time remaining before the convention is relatively short. The cooperation of each branch is urgently requested in making plans and keeping the National Chairman advised of the reception of the idea, and of progress leading to the final exhibit.

The above letter has been sent to each Branch Secretary. Comment from individual interested members is invited.

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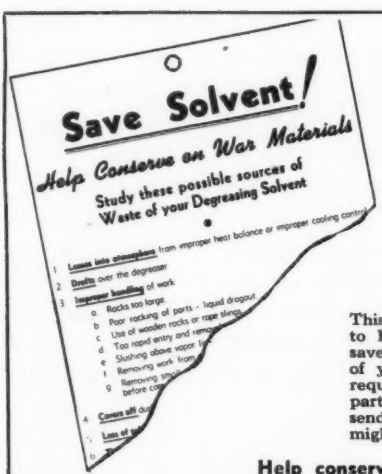

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ANSWERING BERT SAGE

By GEORGE SIMMONS

WHILE sitting up in bed luxuriously recuperating from 25 to 30 years inhaling of HCl. Bright dips, CO_3 NaCN and more recently Cronak and the "Low Temperature" blacks, (for Gawd's sake keep the cold water out, says Doc Myers), along comes our own little contribution to contemporary literature the "Review." Having nothing particular to do at the moment, having finished Toraton Smith's hilarious and may I whisper risque "The Bishop's Jaegers," (drawers to you Bert) the day before; also the blonde across the street had already gone to work leaving me no point in still looking out the window, I lazily started in on it. After the usual thumbing of Freddie Gumm, Dave Clarin, Doc Myers, Bert Daw, Geo. Lawrence, and 15 or 20 others, I was stopped with quite a jolt on page 1095, to see my old pal and one time side kick in print again; I mean the merchant mariner from way back with the Harvard accent, Bert Sage. Well I really had to do justice to that, it is all too rarely a plater has gumption enough to write up something for publication these days, so I spruce up a bit and shave and then spoiled it all by using some high octane barber water somebody gave me for Christmas. Good Gawd I shall never look the same again; somebody must have been jealous of my looks (I might say with some modesty, no wonder) but I won't. If the editor will allow me a personal word to Bert, I would like to mention the aforementioned perfume left me smelling like a week wind bound in the Lower Hope loaded with you know what from Battsea. (Thanks Ed.)

To get to Bert's article, I read it through somewhat carelessly and then thought I had better read it again, as my first impression was that he had thought of a number, doubled it, added .000742", squared it converted to gms. per liter and then the damn thing was plated too thick on the edges and had cost too much. I started in again and ah, I find Bert's old pessimism and worry about the future of plating coming out once more. First I think it was lacquers, then it was plastics, and now it is cost. Far be it for me to belittle the cost angle in production, but I do think the plater need not concern himself with cost *first;* there is usually some or should be someone far more competent to handle that

end of it than he is. The complexities of cost usually go far beyond the plater's jurisdiction; his chief concern must be in the field of quality production. I have said before and I would like to repeat that there is no part of a manufacturing cycle that is so concerned with every operation in it as the Metal Finishing. The live plater will see to it that he has some knowledge of the steel the part is made of, he will have some ideas on design and so on all the way to the finished part, as every step has some bearing on what should be his responsibility of the quality of the finished product. There is a vast difference between a cheap product and one low in cost; a product low in cost can be of first class quality and maintain a ready market but a cheap ply made one never can. That might be a play on words but ask any buyers of finished merchandise and he will tell you it is true.

The specific instance in which Bert goes so much in detail turns out to be not the fault of the Cost Accounting Dept. but rather I would say the fault of the Plater. Bert justifies the 250% increase of Ni used over the estimate by the somewhat weak assertion that all this happened before intermediary anodes etc. were understood. I do not think he can brush it off quite so easily. It has been common knowledge for years that such shapes as he mentioned would not plate uniformly and I know he knows it. Also the addition in late years of Brighteners, Antipitters, etc. usually magnified this condition especially in Nickel all of which places the error in the Plater's lap.

It is common knowledge among A.E.S. men that Bert Sage has for years been in the front rank of platers, preaching a doctrine of quality, a hallmark he calls it. Such instances as he points out go a long way in undermining the faith we all should have in electroplated finishes. Also such an experience will go a long way in the encouragement of cheaper finishes by some of the lesser known manufacturers. It is the fervent hope of a lot of us platers that in the post-war period specification plating will be demanded by buyers of all electroplated products be they for the 5 and 10 cent store or for Tiffanys. Today we are held to a plus or minus of .0001″ on zinc plated bolts and nuts for instance, let us hope that will be the criterion for all plating after Victory is won. In this way and this way only can we fill our rightful place in the marvellous thing which we call "The American Way."

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The Fundamentals of Chemistry for Electroplaters

Part V. The Determination of Atomic Weights

By SAMUEL GLASSTONE, D.Sc., Ph.D.

IMPORTANCE OF ATOMIC WEIGHTS

ONE of the most important problems in chemistry is that of the determination of atomic weights of the elements. The quantitative aspects of chemical reactions, which find numerous applications in analytical chemistry and electrochemistry, are based on a knowledge of atomic weights. Because of this, and for many other reasons, the atomic weights are of fundamental significance; the present article will therefore be devoted to a consideration of the chief methods that have been used for the evaluation of atomic weights. For this purpose it is necessary, in the first place, to have some knowledge of molecular and equivalent weights. In Part IV (Monthly Review, Feb. 1944) an outline was given of the method by means of which the molecular weights of gaseous substances, or substances that can be vaporized without decomposition, can be determined from density measurements. If the substance cannot be readily converted into vapor, as is the case with many solid substances, alternative methods are available for the evaluation of molecular weights. These involve measurements of the freezing point, boiling point, or related properties, of a solution of the given substance. While leaving the details for the present, it can be stated that such methods are available, so that the molecular weights of most solids, as well as liquids and gases, can be determined.

DETERMINATION OF EQUIVALENT WEIGHTS

It was seen in Part II (Monthly Review, Dec. 1943) that the equivalent weight of an element is defined as that weight of the element which will combine chemically with, or will replace from chemical combination, 8.00 parts by weight of oxygen. A possible method for the determination of the equivalent weight of an element is thus to make

a compound of the element with oxygen, and then to analyze it to find how much oxygen it contains. For example, the compound of copper and oxygen, known as cupric oxide, can be prepared in various ways, as described in Part II; this is found to contain 79.9 per cent of copper to 20.1 per cent of oxygen. It is now necessary to calculate the weight of copper which combines with 8.00 parts of oxygen, and this gives the equivalent weight of the former element; thus,

$$\text{Equivalent weight of copper} = \frac{79.9}{20.1} \times 8.00 = 31.8.$$

This is a simple method, in principle, but it is not capable of any great accuracy. First, the oxides are difficult to prepare in the highly purified state that is desirable in modern precision work; second, the exact analysis of oxides is not always an easy matter. For practical purposes, use is made of a modified definition of the equivalent weight as the weight of the element which combines with or replaces 8.00 parts of oxygen *or its equivalent*. As a result of a series of very careful measurements, the equivalent weight of silver has been found to be 107.88, and from a study of the compound silver chloride, the equivalent weight of chlorine has been determined as 35.457. These values are accurate to better than one part in 10,000. The method used for obtaining the equivalent weight of many elements is to prepare the chloride of the element, i.e., a compound of the element with chlorine. Such compounds can generally be prepared in an extremely pure state. By the action of silver nitrate, an exactly known weight of the chloride of the element is converted into silver chloride; this can be separated and weighed with great precision. Since the equivalent weights of silver and of chlorine are known, it is possible to calculate the equivalent weight of the element under consideration.

Suppose 2.016 grams of the chloride of a particular element yield 5.342 grams of silver chloride; the equivalent weight of the element can then be obtained in the following manner. Silver chloride consists of 107.88 parts of silver and 35.46 parts of chlorine, these being the respective equivalent weights of the two elements; hence, 5.342 grams of silver chloride contain

$$\frac{5.342 \times 35.46}{107.88 + 35.46} = 1.322$$

grams of chlorine. This is the weight of chlorine contained in 2.016

grams of the chloride of the element; hence, there are present 2.016 — 1.322, i.e., 0.694 grams of the element itself, combined with 1.322 grams of chlorine. The equivalent weight of the element, which is the weight that combines with 35.46 parts of chlorine, is thus given by

$$\frac{0.694}{1.322} \times 35.46 = 18.69.$$

The equivalent weight of the given element is consequently 18.69. This, in outline, is the method which has been used for determining the equivalent weights of the majority of elements. In some cases the bromide of the element has been used in place of the chloride, for silver forms a compound, silver bromide, similar to silver chloride, from which the equivalent weight of bromine is found to be 79.92. The equivalent weights of the elements may consequently be regarded as established with considerable accuracy.

EQUIVALENT WEIGHT AND ATOMIC WEIGHT

According to the atomic theory, the atomic weight of an element must be either equal to or a simple multiple of the equivalent weight; the next problem is therefore to find the value of the factor, which must be a simple whole number, i.e., 1, 2, 3 or 4, by which the equivalent weight must be multiplied in order to give the atomic weight. For this purpose, all that is necessary is to know the approximate atomic weight, for then the exact multiple can be readily obtained from the known equivalent weight. For example, in the case considered above, suppose that a rough method gives an atmoic weight of approximately 55; it is obvious that the exact atomic weight must be three times the equivalent weight, i.e., $3 \times 18.69 = 56.07$. No other multiple of 18.69 would give a result near to the rough figure of 55.

APPROXIMATE ATOMIC WEIGHT METHODS

Several methods are available for obtaining approximate atomic weights; the first to be mentioned is of historical interest, for it was used in the earliest reliable determinations of atomic weights. The method is based on the statement made in Part IV that the atom of an element is the smallest particle that can be present in a molecule of a compound. Consequently, the atomic weight is the smallest weight of the element that can be present in a molecular weight of the com-

pound. By preparing a series of compounds of the given element, determining their molecular weights, as already described, and then analyzing the compounds, it is possible to find the weights of the element present in the molecular weights of the various compounds. The smallest of these weights is then the atomic weight. If the molecular weight and the analyses could be obtained with great accuracy, the result would be an accurate atomic weight. However, this is only possible in a few cases, but an approximate atomic weight is sufficient for the present purpose, as stated above.

Another procedure that has been frequently used for assessing atomic weights is based on the fact that the product of the atomic weight of an element and its specific heat is approximately equal to 6 calories at ordinary temperatures; this rule, discovered by Dulong and Petit in 1819, is true for solid elements, with few exceptions. This can be used to calculate approximate atomic weights in the following manner: the specific heat of lead has been found by well established physical methods to be about 0.03, and so

$$\text{Atomic weight of lead} \times 0.03 = 6.0 \text{ approximately.}$$

It is evident, therefore, that the atomic weight of lead must be about 200. The equivalent weight of lead is known accurately to be 103.6, and hence the accurate atomic weight must be exactly twice this value, that is 207.2. No other value is compatible with the approximate result of 200, obtained above.

Several other methods are available for fixing atomic weights; one of these is based on the use of the periodic table of the elements. This is an arrangement of the elements in the order of their atmoic weights which shows certain definite regularities, as will be seen in a later article. The method may be illustrated by reference to a particular case. The equivalent weight of the element beryllium was 4.51, and because it has certain resemblances to aluminum, it was thought that the atomic weight was three times the equivalent weight, viz., $3 \times 4.51 = 13.53$. However, an examination of the periodic table showed that there is no vacant place for an element with this atomic weight, and having the particular properties of beryllium. On the other hand, if the atomic weight was twice the equivalent weight, i.e., $2 \times 4.51 = 9.02$, the value was found to fit in perfectly with the arrangement of the elements in the periodic table.

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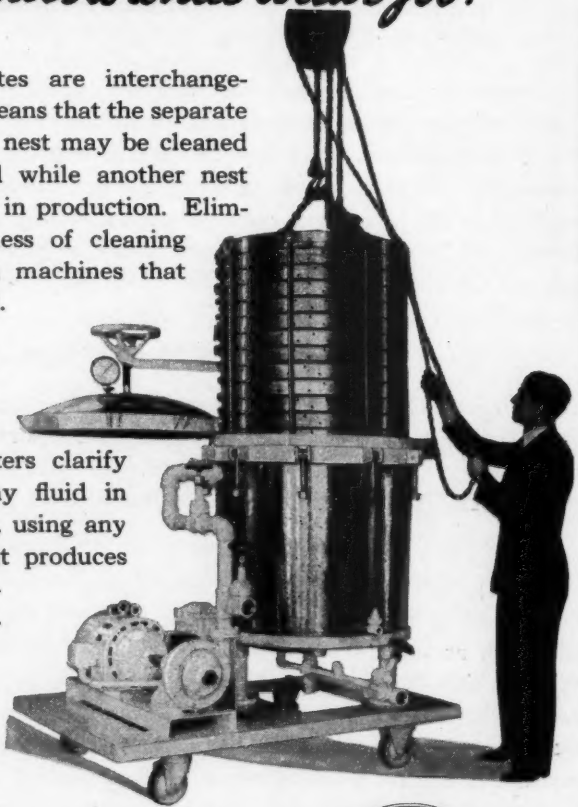

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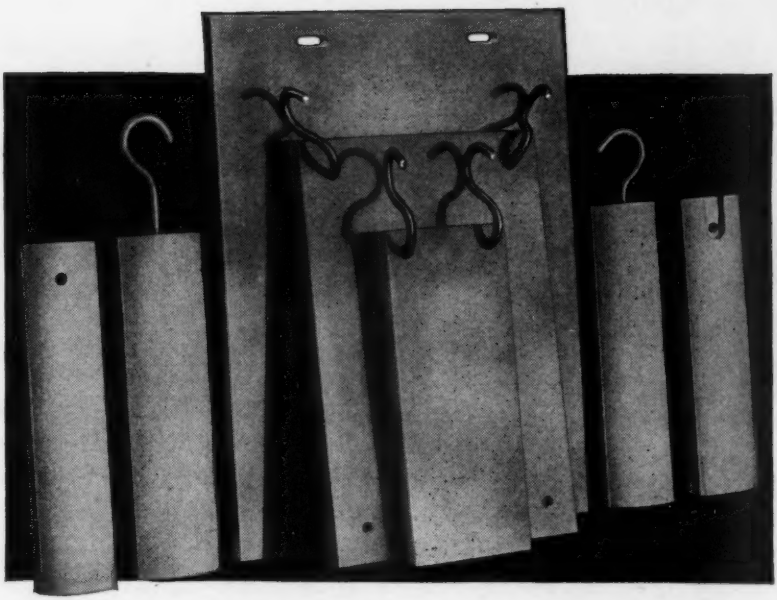

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NEW ZINC PLATING SOLUTION

Interest in zinc is now tremendous as it is being substituted for cadmium coatings on many articles that must be protected against corrosion. There are several different types of solutions available, each type of solution having its particular application.

A special alkaline solution has been developed by the Hanson-Van Winkle-Munning Co., Matawan, N. J. with which is used S-B Addition Agent for producing satin-bright to bright deposits, the degree of lustre depending on the choice of operating conditions.

In unagitated solutions the cathode current density range is from 10-45 amp./sq. ft. Maximum brightness is obtained with the solution temperature maintained at 70-75° F. The deposits are somewhat lustrous as they are taken from the plating bath. A satin-bright to full-bright finish is produced by dipping the work momentarily in a ½% nitric acid solution.

The addition agent used in the S-B solution has an extremely long life. Additions are not required until the solution has operated from 1 to 3 months, the frequency depending upon the amount of drag-out.

Zinc-aluminum anodes are recommended in the S-B solution.

S-B deposits can be heat relieved, blackened, given phosphate coatings or any of the chromate film treatments. The deposits can also be soldered without difficulty. The deposits are unalloyed zinc, giving excellent protective value. The lustrous, silvery coating can be subjected to forming, bending or drawing operations without rupturing or lifting.

Full instructions for mixing, operating and maintaining this zinc-plating solution may be obtained from the Hanson-Van Winkle-Munning Co., Matawan, N. J.

PLATING TIN CANS

That the electrolytic process of plating tin for cans is here to stay is the conclusion of a technical discussion in the January issue of *Modern Packaging* magazine. The process, developed as a wartime measure, saves up to 67 per cent of tin as compared with the conventional hot dip.

The 0.5-lb. conservation plate will continue to be used for non-processed and non-corrosive food products, the article says. The extent of its permanent acceptance in the processed food field, however, depends upon development of economical methods of depositing electrolytically a coating which, while substantially lighter than the 1.25-lb. dip-coat, will be heavy enough to eliminate the present necessity of inside and outside enameling. Such development is under way.

NEW BULLETIN ON ROUGE

In view of the present renewed activity in the jewelry and silverware fields there is undoubtedly increased interest in material of this type. E. Reed Burns Manufacturing Corporation, Brooklyn 11, N. Y., announce two new folders on the subject of BURNSROUGES. Interested parties may obtain full information by writing the manufacturer.

OAKITE COMPOUND No. 86

Developed to meet critical production demands for preventing rust on steel and for securing improved adhesion of such organic finishes as paint, lacquer, etc., an acid-type two-function detergent, heretofore restricted to war plants, has now been released for use in all metal-working plants, by the Technical Research Laboratories of Oakite Products, Inc., New York, N. Y.

Known as Oakite Compound No. 86, this new development is reported to remove light spinning compounds, drawing lubricants, machining oils, finger marks and shop dirt from steel parts. Beyond eliminating the need of preliminary alkaline degreasing often previously required in preparing steel for organic finishing, it also "conditions" the work in the same operation, by importing to surfaces a microscopic crystalline coating. This coating performs the dual function of providing the basis metal for a firm bonding of the subsequent paint coat and for resisting rusting of parts between operations.

Successfully used by many leading war plants, this cleaning and conditioning compound has been utilized to accelerate the production and expedite the finishing of shell cases, bombs, "blitz" cans, automotive and aviation parts, electrical and communication equipment, and many other war supplies. It is also said to have a wide range of application on peace-time products.

Free Service Report, giving further details, is available on request to Oakite Products, Inc., 40 Thames Street, New York 6, N. Y.

NEW LEAD PLATING SOLUTIONS

For the protection of iron and steel against corrosion and to obtain a corrosion resisting coating on non-ferrous metals, electrodeposited lead has been used to a limited extent for many years. The use of lead coatings as a substitute for more critical metals is increasing and may assume considerable proportions.

Through an extended laboratory investigation several lead solutions have been developed by the Hanson-Van Winkle-Munning Co., Matawan, N. J.

Concentrated Protecto Lead Solution which has been sold for many years, is now substantially improved by recent changes in the formula. To prepare a working solution simply add three parts of water to one part of concentrate.

The resulting Protecto Lead Solution is for general purpose, plating at low to medium current densities. The plating range is from 5-15 amps./sq. ft.

Super Protecto Lead Concentrate is a well-balanced concentrate, to be diluted with equal parts of water to form an electroplating bath. It is a modern solution for general purpose plating. As the metal concentration of the working bath is 4 times that of the Protecto Lead Solution, the current density range is extended to 30 amps./sq. ft. or even higher with suitable agitation. The throwing power of this solution is also higher. This solution is recommended for barrel plating.

B-H Lead Solution. This solution is not concentrated but is used for lead plating as prepared. It is designed especially for lead plating bearing surfaces, and is being used by large aircraft motor manufacturers. This solution is also excellent for general purpose plating.

The B-H Lead Solution produces deposits with the proper micro-

structure for subsequent indium plating and heat treatment. Before the material leaves the manufacturer, samples plated in the solution are examined microscopically to make certain that the structure is correct and that the deposits are free from harmful inclusions.

Analytical methods and full instructions for the operation of these solutions are obtainable on request, from the Hanson-Van Winkle-Munning Co., Matawan, N. J.

CLEANERS FOR EFFECTIVE METAL CLEANING

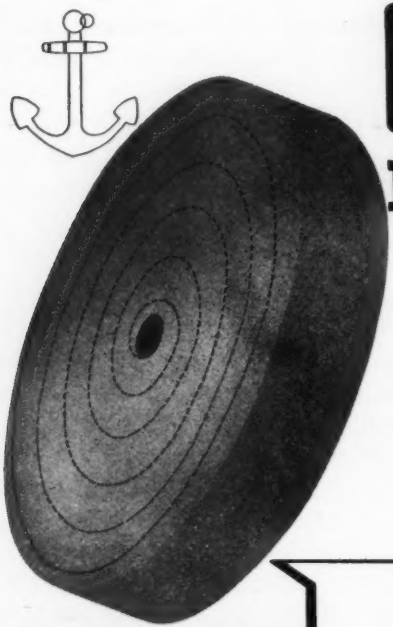
Bulletin C-105 from the Hanson-Van Winkle-Munning Co., Matawan, N. J. This new bulletin deals with the selection and use of cleaners made from water solutions of alkalies, soap-alkali mixtures and soaps. These solutions remove oils, greases and waxes of animal, vegetable and mineral (petroleum) origin, and the inert solid materials contained in them. These inert materials may be: (1) metallic chips or borings from machining; (2) abrasive ingredients of polishing or buffing compounds; (3) various dirts incident to producing and fabricating the objects cleaned.

A total of 19 special cleaners are described, including 8 alkali cleaners of the soaking type for steel, aluminum, zinc, brass, copper, nickel-silver and soldered work; 6 electric cleaners for steel, brass and other non-ferrous metals, and 5 different soap cleaners for removing buffing compounds from brightly polished surfaces of brass, aluminum and die castings.

The Bulletin also includes a very interesting discussion of metal cleaning processes in general, giving in simple language, the fundamentals involved in this type of work.

Copies may be obtained on request from the Hanson-Van Winkle-Munning Co., Matawan, N. J.

CONTROL YOUR PLATING SOLUTIONS
KOCOUR TEST SETS
KOCOUR CO. • 4725 S. CHRISTIANA AVE. • CHICAGO



Cotton
BURRING BOBS *and* POLISHING WHEELS

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We are engaged essentially in War Work

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PHILADELPHIA OFFICE, 1123 REAL ESTATE TRUST BLDG.
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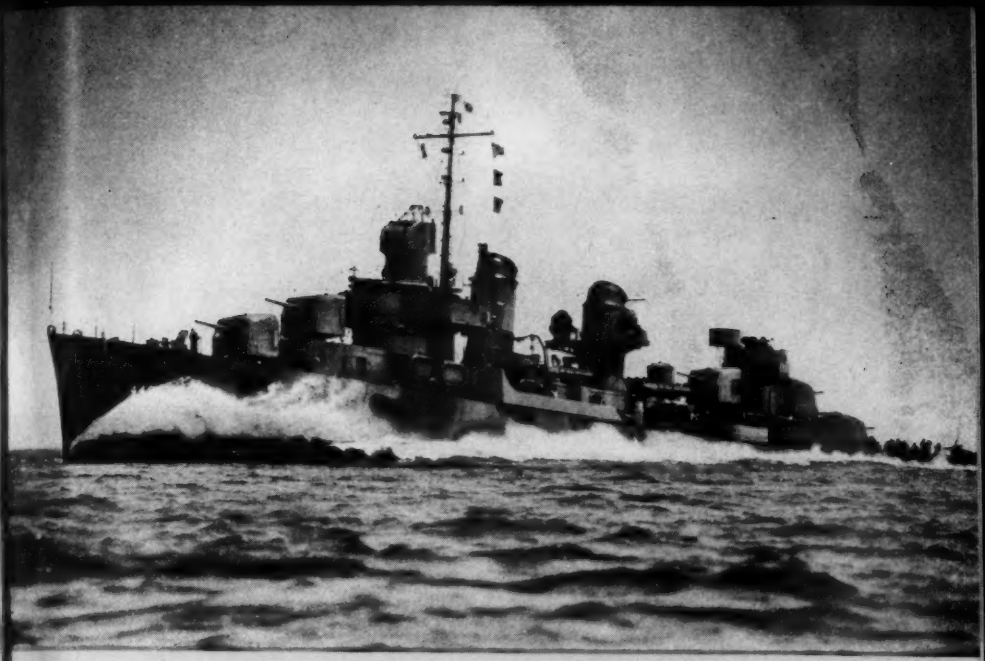


A TRIBUTE TO THE BATH IRON WORKS

from the makers of **PENNSALT CLEANERS**

REG. U. S. PAT. OFF.

● The first ship built in America, the "Virginia," was launched from the shores of the Kennebec in 1607. The Bath Iron Works Corporation is carrying on the tradition of the Kennebec today, launching destroyers like the one above. At its present rate of production, B.I.W. produces in one year more than twice as many of these ships as were launched by them during the entire World War I. Our hats are off to the men and women who have made possible this enviable record.

How fine these ships are is well expressed in the following extract from a letter written by the commanding officer of the destroyer pictured above:

"A word of praise for the grand job the Bath Iron Works did on the ship. She has been through h—l and high water and never failed us. Keep on building ships as fine as this . . . We have put on nearly one hundred and fifty thousand miles and she is as good as new."

We of Penn Salt are proud of the small part we are privileged to play in this outstanding achievement.

Galvanized work on these ships is first cleaned with a Pennsalt Cleaner to insure a finish which will withstand the extreme corrosive conditions of the sea.

Paint stripping is another important use of Pennsalt Cleaners at the B.I.W. In fact there is a Pennsalt Cleaner scientifically designed for nearly every type of metal and maintenance cleaning.

Our chemical engineers will be glad to demonstrate the benefits of Pennsalt Cleaners to you in your plant. No obligation. Write fully to our Special Chemicals Division, Dept. MR.

PENNSYLVANIA SALT
MANUFACTURING COMPANY
Chemicals
1000 WIDENER BUILDING, PHILADELPHIA 7, PA.

NEW YORK • CHICAGO • ST. LOUIS • PITTSBURGH • MINNEAPOLIS • WYANDOTTE • TACOMA

ANNUAL CONFERENCE

American Electroplaters' Society

• • •

JUNE 12, 13, 14

HOTEL CLEVELAND

CLEVELAND

MOST VITAL EVENT THIS YEAR

Annual Conference on

METAL FINISHING AND ELECTRODEPOSITION

INDUSTRY NEWS

STRATTON PASSES

It is with sadness that the Bridgeport Branch of the American Electroplaters' Society informs the Supreme Society and the other Branches of the A.E.S. of the passing of Wilbur G. Stratton, Charter Member and First President of the Bridgeport Branch, on December 26, 1943. It was on December 10, 1943 when he attended the traditional "Old Timer's Party" at the Bridgeport Branch, of which he was an *Honorary Member*, that he spoke of his experiences in the plating game and how he loved it, and was brought along in this fine profession by his father, who also was in the plating business. Mr. Stratton was 78 years old and knew most of the men in the plating industry. He had attended all the conventions in the previous years before retirement. He would always talk with George B. Hogaboom when Mr. Hogaboom was present at our meetings of the fun they had together in the early years of the plating business, and would chuckle over their trials and tribulations they had experienced in their work. Mr. Stratton stated that if he had to start all over again he would choose plating as his business career and never in his life had he had any regrets for being a plater. He was beloved by all who knew him and would always be free and kind to give the younger platers advice on how to do their work well. Interment was at Lakeview Cemetery with C. C. Helmle, R. J. O'Connor, George J. Karl, Wm. A. Ehrencrona, Wm. Thompson and B. Kusterer as pallbearers. It is indeed with sorrow that we must part.

JOSEPH G. STERLING, *Sec'y & Treasurer*

PENN SALT MOVES

Pennsylvania Salt Manufacturing Company announce the removal of their New York offices February 1, 1944 to 40 West 40th Street, New York 18, New York.

District Managers are F. G. RODENBURGH and C. A. McCLOSKEY.

ELECTROCHEMICAL SOCIETY ANNUAL CONVENTION MILWAUKEE, APRIL 12 to 15

HOTEL PFISTER

CONVENTION PROGRAM

Wednesday evening, April 12, 1944: Registration of Members and Guests.

Thursday, April 13, 1944:

7:30 a.m. Group Breakfasts.
9:00 a.m. Meeting of the Board of Directors.
10:00 a.m. Annual Business Meeting of the Society. Tellers Report on Election of New Officers of the Society.
11:00 a.m. Technical Session: "Electrolytic Cells."
12:30 p.m. Luncheons of the Divisions, Division Officers in Charge.
2:00 p.m. Scientific-Technical Session: "Powder Metallurgy."
7:00 p.m. Foregathering.
7:30 p.m. Annual Banquet. Presidential Address: Dr. R. M. Burns. Bestowal of Honorary Memberships (2). Presentation of the Young Author's Cash Prize. Presentation of the Young Author's Book Prize.

Friday, April 14, 1944:

7:30 a.m. Group Breakfasts.
9:00 a.m. Scientific-Technical Session: Miscellaneous Electrochemical Topics.
12:30 p.m. Luncheon: Short Luncheon Talk.
2:00 p.m. Scientific-Technical Session: Corrosion.
7:00 p.m. Informal Reception to the New Officers of the Society.
7:30 p.m. Complimentary Buffet Supper and Entertainment: Pabst Brewing Company, Host.

Saturday, April 15, 1944:

7:30 a.m. Group Breakfasts.
9:00 a.m. Scientific-Technical Session: Corrosion.
12:00 noon Luncheon in Honor of the New President.
2:00 p.m. Round Table Discussion: "Corrosion at High Temperatures and at High Pressures." Officers of the Corrosion Division in Charge.
5:00 p.m. Adjournment.

How do you select this thin coating that means so much?

MAXIMUM PROTECTION WITH A MINIMUM RECOATING COST—that's what you look for in a rack insulation material. And it's easy to judge your present material against these standards which both Unichrome "Air Dry" Rack Coating and Unichrome Coating 202 measure up to—

SAFE – Contain no ingredients harmful to plating solutions.

TOUGH – Withstand wear and tear of shop handling as well as repeated bending in positioning the work.

DURABLE – Withstand hot cleaners, acid dips, and all plating solutions. Reduces the need for recoating.

ADHERENT – Flexibility prevents cracking and seepage of solution between the coating and the rack.

CONVENIENT – Cuts cleanly and easily at the contacts. Any part can be patched without recoating the entire rack.

Address request for prices or an initial order to the nearest office listed below.

☆UNICHROME "AIR DRY" RACK COATING

A tough, easy-to-use insulation in which racks can be dipped and dried at room temperature. Withstands hot alkaline cleaners, acid dips, chromium and other plating solutions. Available in 1 and 5 gallon containers and 55 gallon drums.

☆UNICHROME COATING 202

A new coating material which, in addition to the properties of Unichrome "Air Dry" Rack Coating, is especially suitable for insulating racks used in anodizing solutions and in hot, strongly alkaline solutions. Applied by dipping at room temperature and normally force-dried to obtain the good adherence required for this severe service. Available in 1 and 5 gallon containers and 55 gallon drums.

OTHER U. C. PRODUCTS AND PROCESSES TO SERVE YOU

CHROMIUM PLATING for wear-resisting, oil-retaining and other types of finishes.

☆UNICHROME ALKALINE COPPER for smooth, lustrous copper plating in a non-cyanide bath.

☆UNICHROME ALKALINE ZINC for smooth, lustrous zinc plating in a non-cyanide bath.

☆ANODIZING for anodic treatment of zinc giving greatly increased corrosion-resistance and an attractive black or yellow finish.

☆Trade Mark Reg. U. S. Pat. Off.

☆UNICHROME ALKALINE STRIP BATH for speedy removal of copper, chromium, zinc, etc., from steel without etching the base.

☆UNICHROME STOP-OFF LACQUERS AND COMPOUNDS each specially formulated to meet specific plating problems.

☆UNICHROME CLEAR LACQUERS each specially formulated to meet specific service requirements.

☆UCILON – a corrosion-resistant coating material for protecting surfaces against acids, alkalies, water, gasoline and various corrosive chemicals.

UNITED CHROMIUM INCORPORATED

51 East 42nd Street
New York 17, N. Y.

Waterbury, Conn. ★ Detroit, Mich.

OBERENDER RETIRES

John C. Oberender, New England sales manager of the Zapon Division of the Atlas Powder Company, Stamford, retired today, February 1, after 25 years service with the company.

Mr. Oberender joined the company in 1918 as a salesman. He was promoted to assistant manager of the firm's Chicago office, and later became assistant and manager of the New Haven office. Subsequently he went to the general office at Stamford.

NEW NEUTRAL BATH BOOKLET

The A. F. HOLDEN CO., New Haven 8, Conn., Metallurgical Engineers and Manufacturers of Heat Treating Baths and Pot Furnaces announce for immediate distribution a 28 page booklet on Holden Neutral Baths.

The booklet was made possible through the cooperation of a number of firms who supplied pictures of tools and equipment used continuously on production with Neutral Baths.

The booklet contains new information and definite possibilities whereby additional savings to users, can be effected.

Copies may be obtained by writing to The A. F. Holden Co., mentioning the *Monthly Review*.

JAMES VITALE PASSES

We are sorry to announce the death of James Vitale, an active member of Buffalo Branch, February 3rd. He was buried at Olean, New York. Mr. Vitale leaves his wife Hannah, two children and many friends. For the past four years Mr. Vitale was foreman plater at the Bell Aircraft Corporation. His passing was a great sorrow and he will be missed by many of his brother members.

When you buy equipment for plating, buy with an eye on quick conversion to peacetime decorative plating with nickel, chrome, copper, brass, etc. Meaker equipment can be changed over to the peacetime job in a jiffy. Fact, many of our customers right now are getting new equipment to hustle that war job, and bustle that peace job, too, as soon as we have finished the Axis.

The Nation's Leading Plating Engineers

The MEAKER Co.

1635 SOUTH 55TH AVENUE, CHICAGO

AUSTRALIA FORMS BRANCH

The membership will be pleased to learn a new branch has been formed in Australia. At a meeting January 4th, attended by approximately 40 SIDNEY Electroplaters the following officers were elected: President, Mr. Benjamin W. Armstrong, 67 Second Street, Ashbury, N.S.W., active member of Los Angeles Branch; 1st Vice President, Mr. L. Phelan, 147 Bland Street, Haberfield, N.S.W., applicant for active membership; 2nd Vice President, Mr. Henry H. Lambert, Care Department Aircraft Production, Liverpool Road, Chullora, N.S.W., applicant for associate membership; Secretary-Treasurer, Mr. Lawrence A. Smith, Care 19-25 Regent Street, Sydney, N.S.W., Associate member Los Angeles Branch; Librarian, Mr. Glen S. R. Walker, Wallangra Road, Dover Heights, N.S.W., Active member Los Angeles Branch; Board of Managers, Mr. William James Palmer, 43 Frederick Street, Ashfield, N.S.W., applicant for active membership; Mr. Hilary George Harvey, 16 Hamilton Avenue, Earlwood, N.S.W., applicant for active membership; Mr. Frederick Bellinger, 13 O'Maira Street, Kogarah, N.D.W., applicant for active membership.

MANDERSCHEID MOVES

The MANDERSCHEID CO., formerly at 5118 NORTH MENARD AVE., CHICAGO announce removal to larger quarters after February 15, 1944, to 605 WEST WASHINGTON ST., CHICAGO 6, Illinois.

Recently the company has announced several new products. Folders are available on request giving full information on JIFFY POLISHING WHEEL WEIGHTS and MODERN WHEEL RAKES. Regarding wheel weights the manufacturer says: Jiffy Polishing Wheel Weights are small metal discs with a countersunk nail hole in the center. The purpose is to give perfect balance to the polishing wheel, necessary to accomplish its purpose. The wheel rake is a modern tool to rake out or shape buffing, polishing and burring wheels. Designed because home-made, makeshift devices represent a safety hazard and a proper rake is necessary to keep wheels in the best condition.

CHICAGO ANNUAL MEETING

The 32nd annual educational session and banquet of the Chicago Branch was held January 22nd at the Palmer House.

Over 400 attended the educational session and 908 were present

for the dinner and banquet.

Out of town visitors included President George Wagner from Newark, Mr. E. Holman, President of the Los Angeles Branch, and many others from Detroit, Grand Rapids, Indianapolis, Philadelphia, Milwaukee, and St. Louis branches.

Secretary Jim Hanlon reports the meeting a huge success with almost a national flavor. Jim also requested that grateful thanks be extended to the manufacturers, supply houses and all who contributed to make the event so outstanding.

LOGOZZO TO MacDERMID

MacDermid Incorporated of Waterbury, Connecticut, manufacturers of metal cleaners and distributors for cleaning, plating and finishing equipment, announce the appointment of Mr. Arthur Logozzo as a technical service engineer. Mr. Logozzo brings to this organization a broad knowledge of the metal finishing industry. He is recognized as a leading authority on hard chrome plating and has addressed many of the various technical societies on this subject.

Mr. Logozzo won first prize for an exhibit of chrome plated dies and molds at the 1941 American Electroplaters' Society Convention, at Boston. He also won the General Electric Coffin award in 1942 for unusual and persistant effort in developing a new and efficient method of chrome plating molds. This is the highest award General Electric gives for contributions to the electrical art.

Articles written by Mr. Logozzo have appeared in the American Electroplaters Society Monthly Review, Metal Finishing, Modern Plastics, Tool & Die Journal, British Nickel Bulletin, Canadian Metals, Iron Age and many others.

Mr. Logozzo's talents are available to all New England manufacturers for the installation of plating equipment or for the servicing of existing equipment and plating processes.

McCORD LEAVES W.P.B.

W. W. McCORD has resigned from W.P.B. to become Sales Manager of CHANDEYSSON ELECTRIC CO., ST. LOUIS, MO.

Mr. McCord joined W.P.B. the day after Pearl Harbor and leaves the position of Chief of the Electroplating and Anodizing Equipment Section of the General Industrial Equipment Division.

Mr. McCord has a rich background in the industry. His various activities include the following: Former associate Editor of the *Review*, President of Detroit Branch of A.E.S., Member Board of Managers, Chairman of 1934 Convention held at Detroit, President, Detroit Branch of Electrochemical Society, Chairman of Electrodeposition Division of the Electrochemical Society, and member of publication committee.

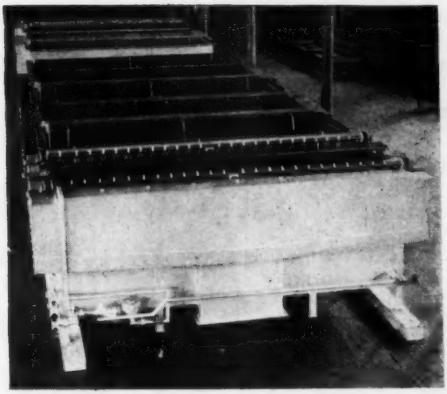
OSCAR E. SERVIS PASSES

Mr. Oscar E. Servis, Honorary member of the American Electroplaters' Society died February 9, 1944, at Chicago. Mr. Servis devoted most of his active life to the plating industry which he entered in 1894.

Mr. Servis was born in Sweden in 1878 and came to this country while still a youth. He attended night school in Chicago and obtained his chemistry training under Professor Emory of Chicago College. At the time Professor Emory was instructing at the Y. M. C. A. Central College. The Chicago Branch held their first series of chemistry classes at the "Y" from 1914-1917.

In 1894 Mr. Servis joined the Pullman Car Company to learn plating, polishing and buffing. In 1901 he made a connection with the Felt and Tarrant Company and remained with them, as Supervisor of Plating and Finishing until his death. Thus his connection with this firm covered a period of 43 years.

Mr. Servis was a charter member and Secretary of the Chicago Branch. Later he became successively Librarian and President. Mr. Servis helped write the by-laws and the constitution of the Supreme Society and subsequently held the positions of Supreme Secretary and Supreme President.



As Improvement Follows Improvement

In order to offer better and better finishes to the public, it is necessary to equip for producing these finishes at a favorable cost. That is, when procedures change and new equipment is being ordered, the old designs must be modified to fit exactly the new procedures.

Storts service includes helpfulness in developing design details to speed production, save materials and reduce maintenance costs.

STORTS WELDING COMPANY

42 Stone Street Meriden, Conn.

Manufacturers of Welded Fabrications to Specification

BRANCH NEWS

Business and Social News • Educational Activities

SIXTH ANNUAL

NEW ENGLAND REGIONAL MEETING

New Haven – April 22nd

Tickets — $4.00 each

Educational Sessions

2 P. M.
Strathcona Hall, Yale University

Papers:—Availability of Metals and Outlook for Immediate Future
Regenerative Plating.

Womens' Program

2:30 P.M.
Matinee performance, Shubert Theater

Clinic:—Equipment Engineering
Theoretical Aspects of Finishing
Buiness & Governmental Administration
Organic Finishing
Practical Applications of Finishing.

Banquet, Dancing, Entertainment

7 P.M. Ball Room, Hotel Taft.

WATERBURY BRANCH

The Waterbury Branch held its regular monthly meeting, Friday, February 11, 1944. Dinner was served as usual at 6:30 P. M. in the Colonial Room. When President Carl Kilborn opened the technical session at 8:00 P. M., thirty-two were present.

Moving pictures were first on the program, showing "Service in Submarines," "The Historical Meeting of Roosevelt, Churchill and Stalin" and the "Battle of Tarawa."

George Dubpernell reviewed the new second edition "Electrochemistry," Volume 2, by W. A. Kohler, published by John Wiley & Sons, Inc. This second edition contains very little new material but has a good section on electroplating and is a good practical book on electrochemistry; however, it is not worthwhile purchasing if you already own the first edition.

Bill Starr reviewed the Cadmium Order M-65, reissued January 22nd and January 31st. Platers using 100 pounds or less of Cadmium in any one month may now obtain their supply without application, merely certifying the metal is intended only for permitted uses.

Attention was called to the New England Regional Meeting to be held in New Haven on April 22nd. Committees have been formed to prepare for this gathering and Waterbury has been assigned the task of collecting contributions.

Technical Chairman Jack Carr was happy to introduce one of our own members as speaker of the evening, Patrick Romano, formerly with United Chromium Corp., who attended our meetings regularly when in Waterbury. Since going to Springfield Armory in charge of testing and development of metal finishes we have seen very little of him and so were particularly pleased to welcome him at this time. Mr. Romano's talk "Ordnance Finishes for Small Arms Weapons" covered the types of finishes used, their purpose and value for pro-

tection under adverse climatic conditions and mechanical erosion from constant use. Mr. Romano's display of weapons and parts illustrating these finishes and what might be expected of them was complete and extremely interesting.

Ellsworth Candee ably introduced another member of our Branch, present for the first time, Jack Bain. Mr. Bain, business manager of the Review, briefly pointed out the gains made both in text and advertising in the past few years. Members of the Society may feel justly proud of its achievements.

The business meeting of the Branch will be held Friday, February 25th, at the home of Carl Kilborn. All members are urged to attend.

Meeting adojurned at 10:15 P. M.

S. L. HENN, *Secretary*

BUFFALO BRANCH

The regular February meeting was called to order by President Logan at 8:20 p.m. The roll call of officers showed seven of our nine officers present. We also had with us, seven guests and one new member who were introduced to the members and given a hearty welcome. The guests were: Mr. Harold Ransburg, our guest speaker, and his associate Mr. E. P. Keene both of the Harper J. Ransburg Company; Mr. L. M. Dennison of the Ferbert-Schorndorfer Company; Mr. William Halliday and Mr. N. G. Almgren of the Swanson Machine Company; "Cyanide Bill" Schneider of du Pont; and Mr. H. R. Hensen of Pierce & Stevens Company. Our new member was Mr. Zdzieblo of the Logan Plating Company.

The minutes of the January meeting were read and approved.

President Logan announced with regret the sudden death of Jim Vitalie, one of our most active and best liked members. We all feel his loss acutely and our hearts are with his wife and children to whom his loss is such a calamity.

The party committee reported that they had made tentative plans with the Markeen Hotel for a buffet dinner and dance on April 22, subject to the approval of the members. A motion was offered by Mr. Nigro, seconded by Mr. Lamprecht and passed, approving these arrangements. The secretary was instructed to send out invitations with return cards so that the Hotel could prepare for the proper number of guests a few days in advance.

A letter from the Rochester Branch inviting our members to their Educational session and dance to be held March 11, was read and discussed. Several members expressed their intentions of going.

Mr. Fotheringham introduced our guest speaker, Mr. Harold Ransburg who had drawn out a group of thirty men to hear his talk in spite of the weather. Mr. Ransburg described, and illustrated with slides, two processes for obtaining smooth paint coatings by the use of high voltage electric fields.

Spray painting which is used where dipping is impractical is accomplished by passing the article through an electrostatic field into which a soft spray of the paint is being sprayed. The paint particles passing into the electrostatic field become charged and are attracted to the article which is at ground potential. By this process it is possible to have up to 90% of the solid paint applied to the article as compared with an average of about 20% for the normal type of spraying.

A field of 100,000 volts is used, being set up by a series of electrodes spaced about eleven inches from the work piece. A soft low velocity spray is obtained by the use of low air and liquid pressures, namely about 20 lbs. air and 1 lb. liquid.

When the shape of the article is such that it can be conveniently dipped, this process is recommended with a detearing operation which removes the excess paint and prevents fatty edges and tear drops. The article is dipped and allowed to drain for one to three minutes and is then passed through an electrostatic field which removes the excess paint and leaves a smooth uniform coating.

In the discussion that followed, two questions seemed uppermost in the minds of the listeners; namely: What is the danger to personnel? and what is the danger of explosions? Mr. Rans-

burg explained that the high voltage equipment was designed so as to have a maximum current capacity of one hundredth of an ampere which is about one-tenth of what is considered to be fatal. Also, any spark produced in the field would be a cold blue spark and not the type to ignite an explosive mixture, even if one could be produced. However, the standard spray booths are designed to remove fumes fast enough to prevent the formation of any explosive mixtures, the factor of safety in this case being about 10 to 1.

Mr. Ransburg was given a rising vote of thanks for his excellent paper and his interesting presentation of the subject.

Before adjourning at 10:45, the members passed a motion proposed by Mr. Fotheringham and seconded by Dr. Wernlund, that our treasurer purchase a $500 negotiable bond from the money in our treasury.

PHILADELPHIA BRANCH

Philadelphia Branch A. E. S. January meeting came to order at 8:30 p.m. on the 4th Friday with President Verrell in the chair. 1st Vice-President Racine and George Gehling of the Board of Managers being absent.

President Verrell turned the gavel over to the Librarian, Henry G. Orlik, who introduced the speaker of the evening (Cyanide) Bill Schneider of the E. I. duPont Nemours Co., Inc.

The speaker, whose subject was Bright Zinc, wasted no time in getting to the "meat" of his subject.

Bill gave his company's best operating conditions for their solution as

Zinc	4.5- 5.5	oz./G.
Total Cyanide	8.0-10.0	"
Sodium Hydroxide	14.0-15.0	"

Maximum temperature 85°F.

@ 40 amperes per square foot

stressing the need for purification of the solution through the use of Sodium Sulphide and Filtering.

There were many questions, and for all Bill had a ready answer.

President Verrell called for a rising vote of thanks.

The minutes of the previous meeting were approved as read.

Under communications — Executive Secretary Candee's answer on a branch question.

Motion—the dues of Ernest Ohl be exempt. Carried.

The transfer of E. J. Marrero, associate, to New York Branch was approved by the Branch.

The applications of Wm. H. Moyer, active, and Jos. Brosso, associate, were referred to the Board of Managers.

After approval by the Board of Managers John J. Devaney, active, Francis J. Fritz, and Samuel Heiman, associates, were elected to membership.

The Branch approved the Entertainment Committee's dinner meeting for March.

The bills were ordered paid and the meeting adjourned at 10 P.M.

PAUL MENTZER, SR.,
Secretary

LANCASTER BRANCH

The Lancaster Branch of the A.E.S. met Friday night Feb. 11, 1944 at Stevens Trade School.

The application of Charles B. Cupp, Jr. was approved. The resignation of A. J. Connor was accepted and Charles Bowers was suspended by the secretary for non payment of dues.

The chairman of the program committee, Mr. Brubaker introduced the speaker of the evening, Mr. Sullivan of the Divine Bros. Mr. Sullivan's talk was on "Polishing of Metals."

The speaker outlined the various types of cutting wheels such as canvas, leather, bullneck, sheepskin, walrus, cloths, etc. The main item being density of the wheel. The density is not too important with coarser grits but is very important with finer grits. The R.P.M. of the wheel is not as important as the surface feet per minute.

Mr. Sullivan then went into the numerous kinds of buffs and emphasized the necessity of specifying exactly what kind of buffs desired when ordering. The different methods of making sewed buffs and materials used were listed along with description of full disc buffs and the method used for specifying their grade.

A brief history of glue and its manufacture was given. Mr. Sullivan stated that hide glue, from horned animals is

the best for polishing. Hide glue has the most strength, elasticity, and most ductile. Glue for heading wheels should be made up to definite formulas using a heavier glue for heavier abrasive and thinner glue for finer abrasives. Glue should be soaked in water at least 3 hours and then heated, never over a 140°F. The glue pot, stand and brushes should be kept clean as the bacteria can form very easy. Thin coats of glue should be applied to the wheel and the grain rolled on. After the wheel is headed up to the desired thickness it should be left to dry 48 hours at room temperature before using.

WILLIAM H. FORDNEY,
Secretary

PITTSBURGH BRANCH

The February meeting of the Pittsburgh Branch of the A. E. S. was held Thursday, February 10th, at the Fort Pitt Hotel. Dinner was served at 7:00 P.M. and the regular meeting started at 8:00 P.M. Our President, Mr. H. F. Saylor, presided over the meeting. The minutes of the January meeting were read and approved.

Mr. Pinner's letter on the national exhibit was read. Mr. McKeon moved and Mr. Huchel seconded a committee of one be appointed to follow suggestions of Mr. Pinner regarding the national exhibit. Mr. McKeon was appointed to that position. Applications of Messrs Bell, Wolfe and Blumenthal were received for associate and active membership to the A. E. S. respectively. Mr. C. E. Glock's transfer to Baltimore Branch was approved.

Several requests were made for a speaker on alkaline tin plating at our next meeting. The following companies using or selling alkaline tin solutions were suggested as sources for speakers: Jones & Laughlin Steel Corp., Metal & Thermit Corp., and Crown Cork and Seal Co.

The business meeting was closed and Mr. Geo. Merz of Harshaw Chemical Company spoke on lead plating. Mr. Merz spoke particularly on the fluoborate lead solution and the improvement of lead baths during the last twenty-five years. According to Mr. Merz this solution produces a very good plate with only moderately close control. He gave booklets on this plating bath to all present. A great deal of interest was evidenced by the question period that followed. Meeting adjourned at 9:45 P.M. Next meeting March 2nd at the Fort Pitt Hotel.

FRANK R. KELLER

MILWAUKEE BRANCH

The Milwaukee Branch held its regular monthly meeting February 4th in the Guild Hall of the Republican Hotel. The officers' meeting at 7:30 took care of the business details and the regular meeting started promptly at 8 o'clock.

Mr. Allen George of the Exolon Company gave us some very interesting information about polishing grains. He explained in detail the process of manufacturing the polishing grains. His samples of aluminum oxide and carbide were well handled and examined.

Mr. Howard Mc Aleer of the Formax Company carried on with a very informative talk on buffing and polishing compounds. His talk started with early polishing compounds and explained some of the fancies of polishers caused by early use of scented compounds. Abrasives for all types of polishing and buffing were discussed by Mr. Mc Aleer. He gave many ideas on solving problems from burring to highly buffed surfaces on all metals. Particularly interesting was the manner in which his talk was given, he was very informal and his talk was very well received. None of the fifty men present went away disappointed, I'm sure every one were glad they had attended.

Mr. Mc Aleer and Mr. George were given a hearty applause and the meeting adjourned.

The Redi Products Company served a lunch with refreshments. Did I hear someone say, "Bill, where did you get the points for that savory champagne ham?" It was really a grand evening with a grand turnout.

JAMES DURNFORD,
Secretary

TORONTO BRANCH

The regular meeting of the Toronto Branch was held February 11 at the Royal York Hotel with a fair attendance and President Boaz in the chair.

President Boaz introduced Mr. W. Revill, of the Roden Brothers Silversmiths Ltd., as guest speaker of the evening.

Two applications for membership were received and the application of Mr. Joseph Coulthard was elected by ballot.

Letters were read from Mr. E. P. Blandy and Mr. W. L. Pinner.

Mr. Graham gave a report on the progress of the annual Card Party to be held on March 17.

As this was all the business Mr. Boaz called on Mr. Revill to give his talk on the History of Sheffield Plate. The speaker started by putting on display candlesticks and trays that were made in 1810. Unravelling rolls of Sheffield Plate rolled nickel two-thousand in thickness and pure tinfoil, explaining the fuseing of silver and copper in ingot form, then rolling out to the desired thickness, explaining in detail the building up of candlesticks and trays and showing burnishing tools that were 50 years old. He spoke on close plating on horse harness, carriage rails and lamps showing the difference between Sheffield plate and Electroplating by using the rolled gold case of his watch. Mr. Revill stated that Sheffield plate was first manufacturerd in Birmingham and then in Sheffield. Mr. Revill served his apprenticeship in England as a silversmith. He knew his subject and answered questions for the best part of an hour. This talk was one of the best for a long time and the members appreciated it with a hearty vote of thanks. Be sure to come again Bill.

JAMES S. CAIRNS, *Secretary*

QUESTION BOX

Question: How can hot dip be reclaimed when it is contaminated with brass?

Answer: Must be refined.

Question: What causes pitted deposit in hard chrome Sol.?

Answer: Better examine base metal.

Question: Is there such a thing as a perfect Ni. Sol.?

Answer: No.

BOSTON BRANCH

Boston branch met Thursday, Feb. 3rd, at the Statler Hotel, Boston, with Pres. Swift in the chair.

Minutes of the previous meeting read and approved, Communications read, one from the chairman of the convention exhibits in regards to exhibits for the coming convention. Arthur Mintie was appointed to take care of them. Others were placed on file. Bills read and ordered paid.

The following applications were read and elected to membership Michael A. Bronzo, 10 Marshall St., Worcester, Mass., Active, Myer Shapiro, 240 Humboldt Ave., Roxbury, Mass., Associate, Augustus L. Bashe, 21 Park Lane, Newton Center, Mass., Active, James F. Campbell, 160 Portland St., Boston, Mass., Active, Albert I. Wile, 21 Blake St., Westboro, Mass., Associate, Theodore F. Bobak, 82 Sudbury St., Boston, Mass., Act., Samuel Abend, 82 Sudbury St., Boston, Mass., Active, Louis Abend, 82 Sudbury St., Boston, Mass., Active, and Peter P. Rezuski, 82 Sudbury St., Boston, Mass., Active.

Two applications were turned over to the board of managers for approval, Victor Darpino, P. O. Box 477, East Bridgewater, Mass., Active, and Sezai Cankut, 181 Bay State Road, Boston, Mass., Active.

Allyn D. Chabot was granted a transfer to Waterbury Branch, Conn.

Walter Larsson made a report on the banquet and stated that it will be held March 4th at the Statler Hotel, Boston, with the educational session in the afternoon and the banquet and floor show in the evening; the ladies will be taken care of in the afternoon. Tickets will be $4.50 each, this includes everything; so come along, bring the ladies and meet all your friends at the Boston banquet. Don't forget Saturday, March 4, 1944 at 1:30 P.M. Tickets can be had from the Secy.

Wesley Cassell was on hand to tell

us about the coming regional banquet to be held at the Taft Hotel, New Haven, Conn., April 22nd. This is another good time and all members of the A.E.S. should attend. Boston will be there strong.

With all business out of the way the chair was turned over to the librarian, Bob Magnuson. He had as the speaker Dr. W. S. Murray of the Indium Corp. of America. His subject was "Indium and Indium Coatings." This was something new to the members and it was very interesting; it is being used in war work and has become very useful in airplane parts. He answered all questions for the members and was given a rising vote of thanks for his very fine talk. The members also enjoyed the showing of the 1943 World Series games. After a pleasant evening the meeting adjourned at 11 P.M.

A. W. GARRETT, *Sec'y-Treas.*

BRIDGEPORT BRANCH

An open meeting was held Friday, Jan. 21, 1944, at 8:00 P.M., at the Barnum Hotel with 55 members and guests present. President A. R. McNeil opened the meeting calling upon Supreme 2nd Vice President, C. C. Helmle, as Technical Chairman for the evening. Mr. Helmle introduced Mr. Myron B. Diggins, Chief Chemist of the Hanson-Van Winkle-Munning Co., who spoke on "Recent Developments in Zinc Plating" and "Lead Plating." In his talk, Mr. Diggins gave us the high lights on zinc plating to specifications, castings, solution control and Hy-speed zinc deposition. The "Lead Plating" topic was also introduced and the program was interesting from the beginning to the end. We thank Mr. Diggins for a very fine talk on these subjects. Many questions were asked and Mr. Diggins certainly knew the answers which were all enjoyed by all the people present.

Meeting adjourned at 11:10 P.M.

JOSEPH G. STERLING, *Sec'y-Treas.*

The regular monthly meeting of the Bridgeport Branch of the American Electroplaters' Society was held Jan. 7, 1944, at the Chamber of Commerce Rooms, Stratfield Hotel. President A. R. McNeil opened the meeting with 30 members present, including John English and Jack Buckman from the New Haven Branch as visitors.

The roll call of officers was read and Librarian John E. Charleson and Wm. Thompson, a member of the Board of Managers, were reported absent. The minutes of the previous meeting were read and accepted.

Reports of Special Committees:

A special committee, A. R. McNeil and Fred Gotthardt, were appointed to make a survey with the possibility of holding our future meetings at the Barnum Hotel.

Reports of Standing Committees:

Fred Gotthardt, chairman of the Sick Committee, reported Milton E. Hodges and B. F. Kusterer sick and flowers were sent to these members during their illness. Both members are doing fine now and have sent their thanks and appreciation to the Bridgeport Branch. It is with sadness that the Branch is informed of the demise of our beloved friend, Wilbur G. Stratton, Honorary Member of the Bridgeport Branch, and its first President and Charter Member. A floral offering was sent to the bereaved family. The members of the Branch stood up in silent reverence in memory of a person who was beloved by all who knew him. A card of appreciation was received from the family. A motion was made and passed to set aside a page to the memory of Honorary Member, Wilbur G. Stratton.

Hubert M. Goldman, chairman of the Membership Committee, reported eleven men balloting for membership and two applications for membership.

A. R. McNeil, member of the Technical Sessions Committee, reported arrangements made for an open meeting to be held Friday, Jan. 21, 1944, at 8:00 P.M. at the Barnum Hotel. The speaker of the evening will be Mr. Myron B. Diggins, Chief Chemist of the Hanson-Van Winkle & Munning Co., who will speak on "Recent Developments in Zinc Plating," and will touch on the subject of "Lead Plating."

Communications:

A letter from Harold J. Walsh per-

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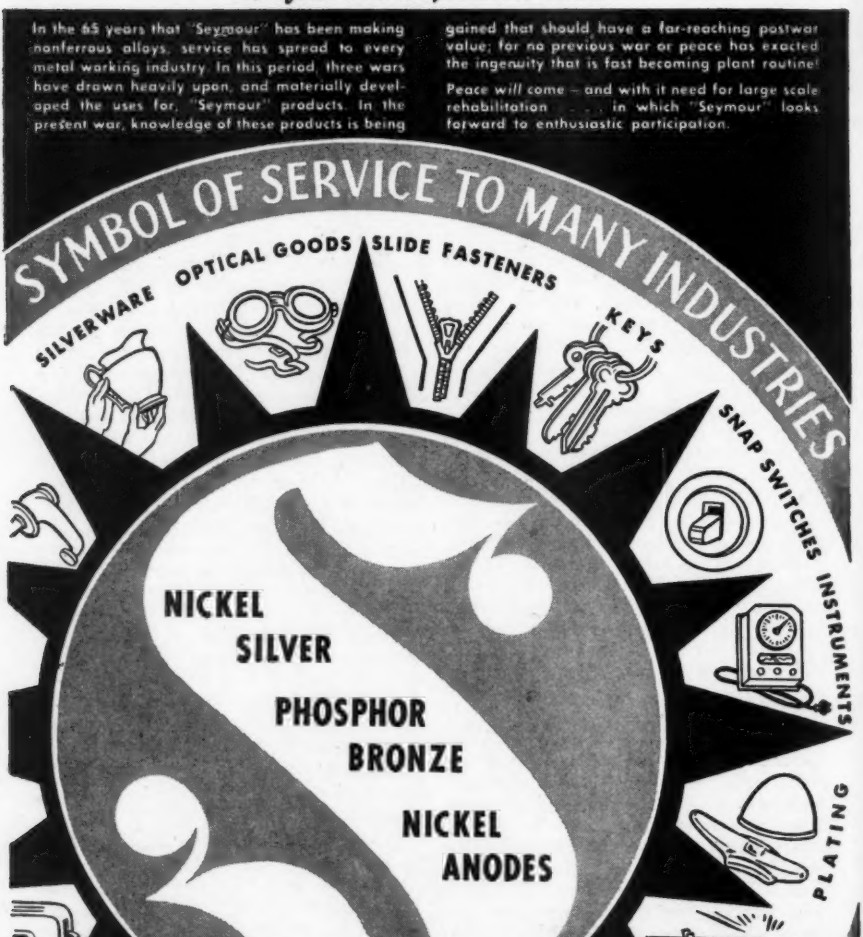
Peace *will* come — and with it need for large scale rehabilitation . . . in which "Seymour" looks forward to enthusiastic participation.



taining to the insurance of our film projector and additional parts to be added. It was decided to bring this under the heading of unfinished business at the next meeting.

A letter from the Visiting Nurses Association of Bridgeport, Inc., was received with contents noted. A motion was made and passed to have the Secretary purchase this fine request of $5.00 bond for the "Campaign against Tuberculosis."

Unfinished Business: None.

New Business:

R. J. O'Connor was unanimously elected as a member of the Board of Managers succeeding the late Wilbur G. Stratton, who held this office for many years.

Bills against the Branch were ordered paid.

Good of the Order: No comments at this time.

The Treasurer's report was read and accepted.

The meeting was turned over to our supreme 2nd Vice President C. C. Helmle by A. R. McNeil as our Librarian, J. E. Charlesen was absent due to business reasons. The aftermath was a round table discussion and Bull Session on the various problems of the Plating Industry which kept everyone interested to the final round.

The meeting was adjourned at 11:00 P.M.

JOSEPH G. STERLING, *Sec'y-Treas.*

BUFFALO BRANCH

Our January Meeting was called to order by President Logan at 8:20 p.m. Seven of our nine officers answered roll call with a total of twenty-four members and five guests present. The minutes of our December meeting were read and approved.

Our five guests were introduced and given a hearty welcome. They were: our guest speaker, Mr. M. B. Diggin of the Hanson-Van Winkle-Munning Company and his associate Mr. R. M. Norton, Mr. A. Cinquino of the Chisholm Ryder Co., Mr. E. F. Brown of the Norton Company and Mr. Chas. Hoskins of the Carborundum Company. Applications for membership were re-

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ceived from Mr. Hugh A. Teague of Melbourne, Australia, Mr. Paul C. Clark of Hamburg, N. Y., and Mr. Henry J. Zdzieblo of Buffalo, N. Y. These were turned over to the Board of Managers for their action.

The bills of the previous month were read and ordered paid. Under the heading of New Business came a suggestion by Don Rice that notices for our meetings should be inserted in the "Daily Calendar" of the Buffalo Evening News. Our treasurer, Frank Nowakowski agreed to attend to this detail. The treasurer's report was then read, approved and placed on file. The meeting was then turned over to our librarian Bill Fotheringham who introduced Mr. Diggin, our guest speaker, who had for his topic "Lead Plating."

Increased interest in lead plating is due to the fact that it can be used in many cases to replace cadmium and zinc as a protective coating for steel. With the curtailment of these strategic metals, a good substitute is highly important. In fact, we are just beginning to appreciate the many uses to which lead plating can be put. Some of the pre-war uses were for battery clips, brine tanks, bus bars in plating rooms, etc.

There are four baths for the deposition of lead: lead fluosilicate, alkaline plumbate, sulphamate, and fluoborate. Mr. Diggin discussed the fluoborate bath. Containers for this bath should be steel with rubber or synthetic rubber linings. Several rubber compounds are known to be OK but the usefulness of all rubber compounds is not known. Some compounds will deteriorate and add colloidal organic material to the bath, causing trouble.

Operating characteristics are as follows:
Metal content at least 16 oz. per gallon
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Cathode current density: 5-30A/sq. ft.
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Temperature: 75-100° F.
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tated. This bath can be used for barrel plating at about 6 volts.

The base metal can be prepared the same as it is for any good plating. A copper strike can be used to give better coverage and protection. Care must be taken to keep sulphates out of the bath. Distilled or de-ionized water should be used to replace evaporation in order to keep the sulphates low. Also a double rinse should be used between a sulphuric acid dip and the plating bath.

The danger of lead poisoning is present but is not great if proper precautions are taken. There is no absorption of lead salts through the unbroken skin but it can be taken in through the mouth or as dust through the respiratory tracts. Therefore, good ventilation is essential, and the drippings should be kept washed off the floor to provent their drying and getting into the air as dust.

As to the protection value of lead, there are at present no concrete figures for direct comparison with zinc or cadmium, but tests are underway to determine this factor. The protective value of lead over cast iron is increased by burnishing according to Mr. Diggin's experience. A good lead coating will take an adherent coating of paint or lacquer.

At the conclusion of his talk Mr. Diggin was given a rising vote of thanks by all present. The meeting was then adjourned at 10:15.

J. C. MAYS

HARTFORD BRANCH

The Hartford Branch of the A.E.S. held its January educational meeting at Trinity College in Hartford, Monday evening, January 17, 1944.

President Ken Bellinger called the assembly to order at 8:00 P.M. There were ninety-six members and guests present including three from the Springfield Branch and eleven from the Bridgeport Branch.

Harry Sanders, acting technical chairman, introduced the speaker, Mr. Charles Cohn of the Technical Process Division of Colonial Alloys Company. Mr. Cohn gave us a very interesting

talk and demonstration of how to plate and anodize aluminum. The meeting adjourned at 10.30 P.M.

S. ZAVARELLA, *Sec'y-Treas.*

NEW HAVEN BRANCH

New Haven Branch held its regular monthly meeting on December 14th, 1943 at the Hotel Duncan. Our president, Walter Lynch, opened the meeting by speaking briefly on a membership drive which will commence January 4th, 1944, at which time the New Haven Branch plan an "Old Timer's" meeting. He then turned the meeting over to our Educational chairman, Joseph Sullivan, who introduced the speaker, Mr. L. G. Tubbs, chief chemist of the Mutual Chemical Co. Mr. Tubbs gave a very interesting and informative talk on "Chromic Acid Anodizing for the protecting of Aluminum," and spoke of its present and post-war possibilities. After his talk Joseph Sullivan took the floor to lead a lengthy discussion on the subject and the members gave Mr. Tubbs a hearty vote of thanks.

A buffet luncheon of beer and sandwiches was served while the members enjoyed a real after-meeting confab which dispersed at 11:30 o'clock.

B. J. GAFFNEY, *Secretary*

NEW HAVEN BRANCH

The New Haven Branch of the American Electroplaters' Society held its combined business meeting and "Old Timer's" night, January 4th, 1944, at 8:30 P.M. in the Hotel Duncan.

President Walter T. Lynch presided and made the following announcements: A committee to meet and discuss the possibilities of having the New England Sixth Annual Convention in New Haven this year. The committee appointed is Henry J. Creamer, Robert E. Mooney, Henry L. Kellner, Joseph T. Sullivan, Charles J. Koelbel, Walter T. Lynch and Bernard J. Gaffney, also a committee to head the membership drive consisting of John C. Oberender, George Knecht, John W. English, Bernard J. Gaffney.

Our president announced the death of Wilbur "Bill" Stratton, the first president of the Bridgeport Branch.

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THE SURETY ELECTRO-PLATING COMPANY ORGANIZED BY HORACE H. SMITH

Horace H. Smith, of Newark, N. J., an authority on electro-plating, and, who just completed 40 years of service with Tiffany & Company where he had charge of its electro-plating work, has, with George J. Wagner and William Bruhns, organized the Surety Electro-plating Company to engage in silver, gold, zinc, copper, nickel and cadmium plating, deburring, anodizing, and lacquer and synthetic finishing. The Company's plant is located at 70 Sussex Avenue, Newark, N. J. Its officers are Horace H. Smith, President; George J. Wagner, Treasurer; and William Bruhns, Secretary, who also comprise the Board of Directors.

Mr. Smith, for many years, has been active in the promotion and development of electro-plating and perhaps is the most widely known electroplater throughout the country. In 1913 he organized the Newark Branch of the American Electro-Platers Society and served as its first president for a term of 2 years. He is past Supreme President of the American Electro-Platers Society, the national organization, having served for a term of 2 years in 1929 and 1930.

Mr. Wagner has been engaged in electro-plating and collateral lines for the past 26 years. His firm, known as the Hy-Grade Electro-plating Company, located at 35 Fourth Street, Newark, N. J., will continue in business in the same line. Mr. Wagner is the President of the Supreme Society at the present time.

Mr. Bruhns is president of the Newark Branch of the American Electro-Platers Society.

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Bill, who at the time of his death was seventy-eight years of age learned the plating game from his father. The New Haven Branch joined the entire American Electroplaters' Society in mourning the passing of Bill Stratton.

President Lynch opened the "Old Timer's" night by welcoming the out of town guests. Many members of the Waterbury Branch attended, including Mr. E. T. Candee, our Executive Secretary. Through the courtesy of the Lea Mfg. Co., moving pictures of the 1943 and previous conventions were shown.

Mr. Joseph Downes of Remington Rand, Division of Hamilton Standard Propellor Company, Binghamton, New York, was the speaker of the evening. "Joe," as he is known to his many friends in the finishing business spoke on "Wartime Finishes," discussing the various protective finishes and the technique in applying them. Joe held the attention of the members and guests who found his talk very stimulating and hope to hear more from him in the near future. He was given a hearty vote of thanks for his fine talk and his courtesy in coming such a distance to talk to his branch.

Refreshments and beer were served and new members were given a chance to get acquainted with the "Old Timers."

The meeting adjourned at 12:00 P.M.

B. J. GAFFNEY, *Secretary*

SYRACUSE BRANCH

The January meeting of the Syracuse Branch A.E.S. was held at Leonards Restaurant in Syracuse, Friday, January 21. This was our Annual meeting for election of officers. Since the birth of this branch two years ago, we have been out of step with the other branches of A.E.S. in respect to the end (or beginning) of our new year. After considerable debate and some shivering on the part of some of our parliamentarians for fear we would violate the Constitution or something, it was voted to keep in office the newly elected officials of this Branch until May 1945. This will bring us into conformity with every

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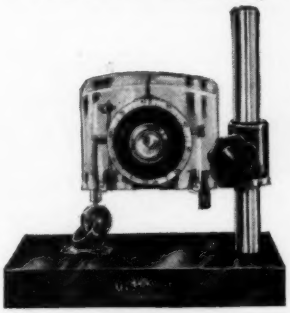

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UNIVERSAL . . . applicable to plane, convex or concave surfaces.

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Barrel finishing has solved many such problems. Write to us about yours and send a few unfinished samples of your small, metal parts. We'll gladly tell you if they're adapted to finishing with Abbott barrels and materials.
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other branch and we trust it meets with the approval of the Supreme Society.

The Sec.-Treas. Annual report was accepted as read. Our newly elected officers were each called upon for a few remarks. All of them seemed to be filled to the brim with all kinds of ideas for the betterment of our branch. Dr. Murphy of the University faculty was reelected President. We of this branch feel honored in having a man with such a background take enough interest in the Platers Society to give so generously of his time. Paul Swartz, our Branch Adonis, was elected 1st Vice President. He served as Librarian for the last year and says he thinks this will be easier. For 2nd Vice President the courtly, gentlemanly, George Lawrence of Wyandotte Chemical Corp. He is the kind of a guy you expect to start talking with dearly beloved brethren. We feel sure our official family will be more dignified with Brother Lawrence on its board. Neil Maffei was elected Sec.-Treas. He will have his hands full, but he is young and apparently in his right mind. For Librarian, yours truly, George Simmons was honored with that office hoping he can do full justice to it.

For the Board of Managers: Dwight Overcash of the Brown Lipe Chapin Corp., Irving Psyck of the Syracuse Easy Washer Corp. and Herb Gerhardt of the General Super Plating Corp.

Alex Abercrombie was reported as being in the Army. This makes 4 of our members in the armed forces. May they soon return safe, sound and victorious, is the prayer of all of us.

Ed Homan of Frederic Stevens Co. and the Philadelphia Branch, was a visitor. The Year Book of the Newark Branch was distributed with expressions of thanks.

As this is the Swan Song of a retiring Secretary, as far as official records of Branch doings are concerned, may I thank all whom I have had dealings with. Especially to the members of the Syracuse Branch for their trust and confidence in me. I am sure it will serve the best interests of the Syracuse Branch to have their Secretary live in Syracuse. I am sure too that Neil Maffei will prove an able and efficient

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Secretary. I know he will have the cooperation of all of us.

The February meeting is to be held Friday, February 18.

GEORGE SIMMONS, *Secy*

TOLEDO BRANCH

A regular monthly meeting of the Toledo Branch of the A.E.S. was held at the Hilcrest Hotel, Jan. 6th, 1944.

In the absence of the President, Mr. Dressel, and Vice President, Mr. Hunlock, Mr. Kimsley Allison, the Librarian, presided at the meeting.

The meeting started at 8:30 P.M. Minutes of the previous meeting were approved as read. The Treasurer's report was read and bills approved. Mr. Allison gave a five minute talk on the membership drive. The applications of Walter Simonet of the Electric Auto Lite and John Hilfinger of the Hilfing Co. Inc., were acted upon and accepted to become effective as of Feb. 1st, 1944. Mr. Robert Hilfinger's application for reinstatement was voted upon, by the assembly and accepted to become effective upon the necessary arrangements made with the secretary. At this time a general discussion was held under the heading for the welfare of the Branch by Mr. Walter Weiker, at the end of which it was decided that all future unfixed expenditures for the Branch shall first be approved by the membership in the meeting.

The speaker of the evening, Mr. Lundbye, Chief Engineer at the Colliers Publishing Co., Springfield, Ohio, gave out freely with some very interesting information on his experiences and achievements in the Plating field, some of which were very remarkable to say the least.

The Toledo Branch wishes to thank Mr. Lundbye and the Colliers Publishing Co. for the pleasure of his association, and for the very interesting information on Plating revealed to us in his talk on our educational program, and sincerely hope that we may be privileged with his presence in the not too distant future.

Meeting adjourned at 11:00 o'clock P.M.

G. BERGMAN, *Secretary.*

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CHICAGO BRANCH

The 382nd monthly meeting of Chicago Branch was held Friday, Feb. 11, 1944, at the Medinah Club, with the Electro Chemical Society.

A short business session was held with President R. J. Hazucha presiding. The reading of the Jan. 14th minutes was postponed until our next meeting March 10th.

New applications were read and committees appointed on them, and the several applications on hand ballotted on.

The financial report of our 32nd annual educational session and banquet read and placed on file.

On Jan. 18th there was an important message sent out regarding a tuition-free course in electroplating at the Lewis branch of the Illinois Institute of Technology. Mr. C. Kocour deserves the credit for calling the attention of the Officers of Chicago Branch to this course.

I was very sorry to report the death of one of the Charter members of Chicago Branch who was known from coast to coast, by A.E.S. members, Mr. Oscar E. Servis, who was a past National President and an Honorary Member of the National Society. Chicago Branch extends its deepest sympathy to the family of Mr. Servis.

The speaker of the evening was Dr. R. M. Burns, the National President of the Electro Chemical Society, who resides in New York. Dr. Burns made a very interesting talk on "Corrosion Problems of Modern War," and answered many questions asked by those present. There were 76 present for dinner and a total of 125 present for the meeting.

The weather was the worst that we have had this winter and the large attendance at the meeting, several from out of the city, proves that the Platers and Chemists are brave men who will go forth in any type of weather in search of knowledge regarding our industry. The meeting adjourned at 9:45 P.M.

J. W. HANLON, *Secretary*

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HOTEL RESERVATIONS FOR THE CLEVELAND CONFERENCE

Your Committee on Hotel Reservations, Mr. P. Ross Lyons, Chairman, has formulated the following plan for your convenience in making the proper reservations for your hotel accommodations while attending the 32nd Annual Conference.

At an early date there will be placed in the hands of all Branch Secretaries a supply of mailing cards to be filled in by anyone desiring rooms at the Hotel Cleveland. This card is to be returned to the Hotel Cleveland management who will acknowledge your reservation direct to you. Preserve this acknowledgment and be prepared to present it when registering at the Cleveland as it will be your identification for the space it calls for.

In order to conserve hotel space it is suggested that members traveling alone team up with some other member of his Branch and make a reservation for a double room instead of two single rooms. This will reduce your hotel costs and provide agreeable companionship in addition to releasing a room for someone else.

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Double occupancy	$4.50, $5.00, $5.50, $6.00, $6.50, $7.00, $8.00
Double occupancy with twin beds	$6.00, $7.00, $8.00, $9.00, $10.00
Parlor, bedroom and bath, single	$10.00 up
Parlor, bedroom and bath, double	$12.00 up
Parlor, two bedrooms and bath, three persons	$18.00 up
Parlor, two bedrooms and bath, four persons	$20.00 up

Within easy walking distance of Conference Headquarters will be found the Hotels Carter, Hollenden and Statler for those so inclined. Any reservations for these Hotels should be made direct with their respective management.

Announcement Educational Committee for 1944 Annual Conference

By JOHN A. HONNECKER

Educational Director, Cleveland Conference

WE would like to see a more active response to the request for technical papers. What's the matter with Newark, Detroit, Rochester and Boston?

Paul Oldam of Newark should be good for a paper covering decorative gold finishes.

Dr. Young of the New York Branch certainly attracted a lot of comment with his paper in Dayton. The platers certainly were behind you there and we would like to hear more from you in '44.

Mr. H. Narcus of the Springfield Branch has submitted a paper, "Plating on Plastics" which will attract a lot of attention.

We would like at least (1) one paper of this character from each branch. The Cleveland Conference will be as successful as you care to make it. Grab your oar and start rowing.

The program is open to every member; we want to hear from the platers and the Phd's. We are all moving in the same direction.

MEMBERSHIP REPORT

CLARENCE C. HELMLE

Chairman, Membership Committee

To March, 1944

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PETER P. RZEZUSKI, 82 Sudbury St., Boston, Mass., Active

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JOSEPH A. BONAZZO, 1173 Noble Ave., Bridgeport, Conn., Associate

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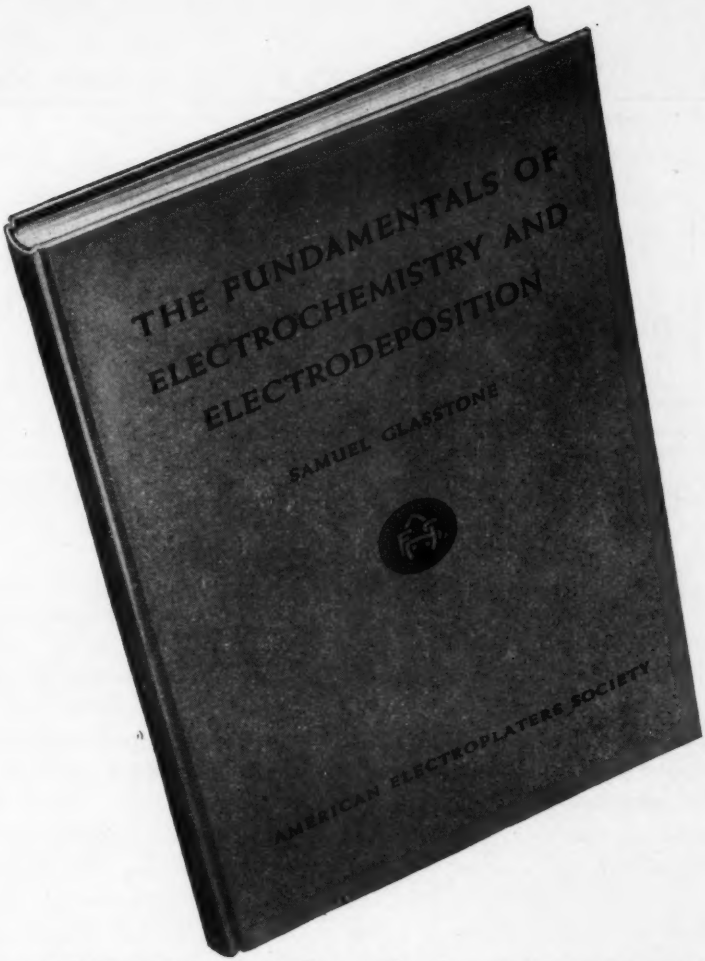
BRANCH	May 1943	Change in Membership	Percent Change
HARTFORD	72	+37	+51.3
ST. LOUIS	83	+27	+32.5
BUFFALO	63	+18½	+29.3
BRIDGEPORT	78	+21½	+27.5
INDIANAPOLIS	60	+12½	+20.8
SAN FRANCISCO	34	+ 6½	+19.1
PITTSBURGH	55	+10½	+19
TOLEDO	37	+ 7	+18.9
CINCINNATI	55	+ 9	+16.3
GRAND RAPIDS	87	+13½	+15.5
CLEVELAND	105	+14½	+13.8
SPRINGFIELD	70	+ 8½	+12.1
CHICAGO	278	+32½	+11.6
BOSTON	117	+13½	+11.5
NEWARK	174	+20	+11.4
DETROIT	280	+29	+10.3
NEW YORK	139	+13	+ 9.3
TORONTO	99	+ 9	+ 9
PHILADELPHIA	132	+ 8	+ 6
MONTREAL	50	+ 2½	+ 5
WATERBURY	103	+ 5	+ 4.8
DAYTON	96	+ 4	+ 4.1
BALTIMORE-WASH.	98	+ 2½	+ 2.5
JACKSON	—	—	—
MILWAUKEE	93	— ½	— 1.6
SYRACUSE	46	— 1	— 2.1
LOS ANGELES	117	— 3	— 2.5
ROCHESTER	86	— 3	— 3.4
PROV.-ATTLEBORO	54	— 2½	— 4.6
LANCASTER	43	— 3	— 6.9
NEW HAVEN	103	—18	—17.4
ANDERSON	30	— 5½	—18.3

MEMBERSHIP MAY 1, 1943	=	2936
MEMBERSHIP MARCH 1, 1944	=	3176
GAIN IN MEMBERSHIP	=	240
Per Cent of Gain 8.1%		



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BOOK DEPARTMENT

BOOK REVIEWS

By

DR. GEORGE DUBPERNELL, *United Chromium, Inc.*

"*Elementary Metallurgy.*" W. T. Frier. 207 pages. Mc-Graw-Hill Book Company, Incorporated, New York. 1942. Price $1.75.

While this book may not be the final answer for an individual with little previous training who desires to learn something of metallurgy without the aid of an instructor, it does take a long step in that direction. The author is a night school instructor and states that his aim has been to present the subject so that it may be easily understood by one having little preliminary knowledge of metallurgy or chemistry. The publishers are more optimistic, stating that the book requires no preliminary knowledge of metallurgy or chemistry, and calling it a "home-study course." Eight of the twelve chapters do have very helpful questions with which to test one's self after reading them. The book is very simply and readably written, but it seems to the reviewer that many students would find points at which they would conclude that metallurgy is not an "elementary" or simple subject. Nevertheless, no simpler textbook has come to our attention, and this volume can be strongly recommended in view of its high quality and low price, and the fact that it covers both ferrous and non-ferrous metallurgy.

The chapter headings are: Iron, Other Refining Processes, Cast and Wrought Iron, Methods of Forming Metals, Constitution Diagrams of Alloys, The Iron-Iron Carbide System, Heat-Treatment of Steel, Grain Structure of Metals, Alloy Steels, Non-Ferrous Alloys, and Testing of Metals. An Appendix contains various data and tables, and most valuable—a complete description of the SAE Numbering System for steels. The book is full of illustrations and curves or charts, including one for the conversion of Brinell hardness numbers to Rockwell "C" and Scleroscope, and vice versa. There is a good index.

(1) Cleaning and Finishing Metal Products. Published by The Iron Age, New York. 235 pages. $3.00.

(2) An Introduction to Electrochemistry. By Samuel Glasstone. 553 pages. $5.00.

(3) Modern Metallurgy for Engineers. By Frank T. Sisco. 432 pages. $4.50.

(4) Standard Handbook for Electrical Engineers. Edited by A. E. Knowlton and R. M. Shook. 2303 pages. $8.00.

(5) Principles and Applications of Electrochemistry, Volume I, Principles. H. Jerman Creighton. Fourth edition. 477 pages. $5.00.

(6) Electroplating and Anodizing. By J. Rosslyn. 224 pages. $2.50.

(7) Hardness and Hardness Measurements, Samuel R. Williams. 558 pages. 1942. Price $7.50.

(8) Lacquer and Synthetic Enamel Finishes, Ray C. Martin. 526 pages. Price $5.50.

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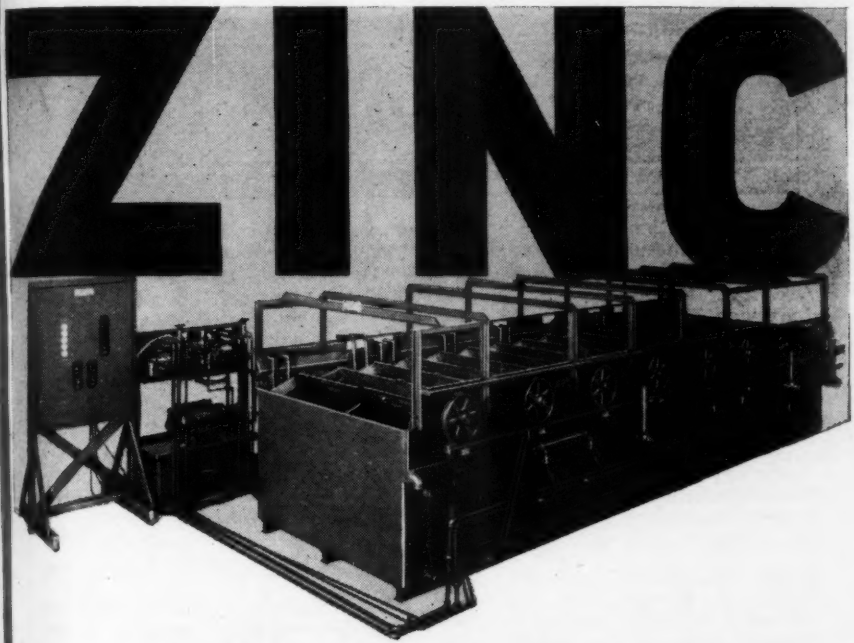

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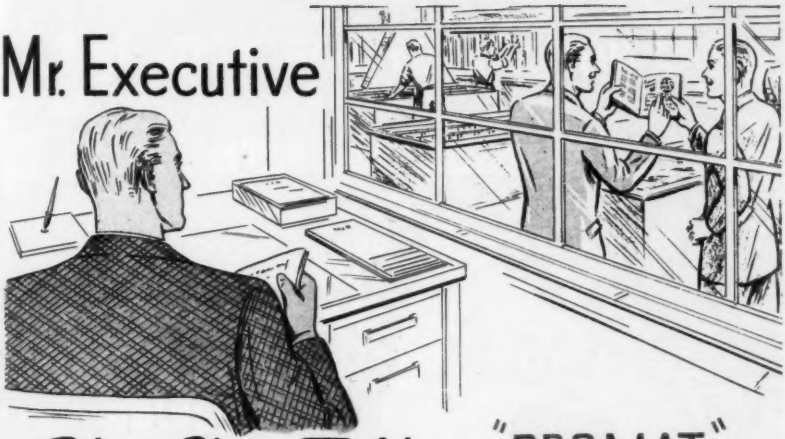

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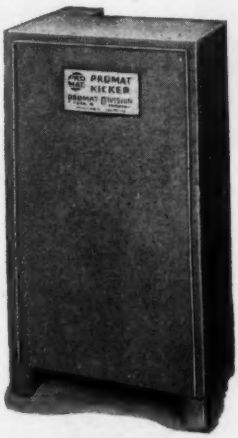

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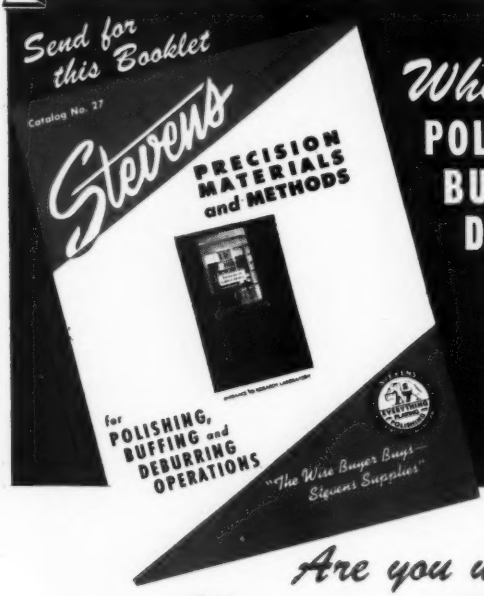
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